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EXPERIENCE, EXPERTISE,
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**TAYLOR
 WOODROW**

NEWS SUMMARY

GENERAL
Jobless figure storm likely
 Ministers are bracing themselves for a furious reaction to the latest unemployment figures to be published tomorrow. They are certain to nudge if not pass the 2m mark.
 Mr. Michael Foot, Labour Party deputy leader, confirmed that the Opposition is preparing for a campaign to recall Parliament to discuss "the most serious industrial crisis the country has known for generations."
 Demands for a change in economic strategy will be intensified when the TUC meets to Brighton next week. **Back Page: Youth unemployment, Page 4**

Anderson choice
 Independent presidential candidate John Anderson named former Wisconsin governor Patrick Leuey as his vice-presidential running mate. Mr. Leuey is a liberal Democrat closely linked to the Kennedys.
Priest on trial
 Russian Orthodox priest Gleb Yakunin went on trial in Moscow charged with distributing documents aimed at undermining Soviet authority.
Hostages moved
 Some of the U.S. hostages in Iran have been moved to secret locations, because, claim their student captors, Washington plans a further rescue attempt before the U.S. presidential elections.
Bribery fine
 Bethlehem Steel Corporation, America's second largest steel company, was fined \$325,000 (\$137,362) for bribing ship-owners' representatives to send ships for repair to its eight yards.
Minister sacked
 China's Petroleum Minister Song Zhenming has been sacked over the sinking of an oil rig last year which killed 72 people. Kang Shien, vice-premier in charge of the oil industry, has been severely reprimanded.
Carrington visit
 Foreign Secretary Lord Carrington started a three-day visit to Saudi Arabia. Diplomatic relations with the UK were resumed three weeks ago.
Restriction eased
 Requests for compassionate leave by IRA prisoners involved in the "dirty protest" in Ulster's Maze and Armagh prisons will be considered as part of an easing of restrictions.
Lord Godber dies
 Lord Godber, former Conservative Agriculture Minister, died at his home, Willington Manor, near Bedford, aged 66.
Carnival time
 An estimated 30,000 people watched the Nottingham carnival yesterday. It was almost trouble-free, with only six arrests after 18 on Sunday.
Raiders disturbed
 Raiders of comedian Frankie Howerd's home near Axbridge, Somerset, left virtually empty-handed after being disturbed by visiting Jehovah's Witnesses.
Briefly . . .
 Zimbabwe's air traffic controllers called a nationwide strike yesterday.
 Twenty-five people died in political violence throughout Guatemala at the weekend.
 Zimbabwe became the 153rd member of the UN.
 Villagers of Marinaleda, Spain, ended their hunger strike after 10 days.

BUSINESS
New oil round being prepared
 OIL COMPANIES may be allowed to buy the right to non-nominate offshore oil blocks in the eighth round of licensing now being prepared. Seventh round nominations could raise £200m. The operators' association warned that maintaining oil self-sufficiency into the 1990s requires up to 90 exploration wells a year compared with 33 last year. **Back Page**
SEAMEN operating about 80 North Sea rig supply boats accepted a 27 per cent pay offer. **Page 5**
IRISH PUNT rose to the top of the European Monetary System for the first time ever on a Friday. It displaced the French franc with the Dutch guilder running a close third place. The Belgian franc showed little movement and stayed above the D-mark, with the latter hardly affected by last week's Bundesbank decision to leave key lending rates unchanged and to reduce banks' minimum reserve requirements. The Italian lira was again the weakest member of the system, and was slowly edging towards its maximum permitted divergence from central rates. High inflation and devaluation rumours were seen as the principle factors.
 Contact has now been established between strike committees in Cdansk and in

Polish workers stay out despite offers

Wide-reaching changes to the Polish leadership and the offer of free elections to the country's trade unions have failed to resolve the shipyard strike.
 Reports to the Moscow Government newspaper Izvestia and by the Tass agency indicate implicit Soviet endorsement of the major economic and political concessions by Mr. Gierek to the strikers.

BY CHRISTOPHER BOBINSKI IN WARSAW

EXTENSIVE CHANGES in both the Polish Government and party leadership and an offer of free elections to the country's trade unions made by the party leader Mr. Edward Gierek after a Communist Party Central Committee meeting at the weekend failed to prompt workers striking in Poland's Baltic towns to return to work.
 Yesterday strikers in Gdansk, who were manifestly unimpressed by the reshuffled waiting for Mr. Jozef Pinkowski, the new Prime Minister, to start talks with the Inter-Factory Strike Committee (IKS), which is co-ordinating the strike in the city.
 Despite a long list of both economic and political demands, the central issue for the strikers in Gdansk has become the demand for an independent trade union movement in Poland. Strikers in Gdansk and delegates from Szczecin say that this issue is growing in importance as the stoppages continue, and that strikers would be willing to mitigate wage rise demands in its favour.
 Contact has now been established between strike committees in Cdansk and in

Hardline Communists in West Berlin warned that the shipyard workers were trying to destroy the "socialist foundations" of Poland and remove it from the socialist community. **Page 2**
 Troops from Czechoslovakia and Bulgaria have arrived in East Germany for a pre-arranged Warsaw Pact exercise, involving 40,000 men. **Page 2**

log to them to do justice to the workers' demands. The number of signatories has grown to over 200 people, including the film director Mr. Andrzej Wajda.
 The task that faces Mr. Pinkowski when he arrives will be to convince the strikers at the shipyards that the authorities' offer of free elections in the existing trade union movement is sincere. Dissidents at the weekend included Mr. Jan Szydlak, head of the official trade union movement, and no new appointment has been made. The Central Trade Union Council is to meet today.
 The close of Mr. Gierek's speech at the central committee meeting on Sunday, which approved the changes, suggest that the authorities are more willing to concede workers' demands than they were in talks last week.
 The workers' protest is now finding an echo within the

Soviet support for concessions

BY DAVID SATTNER IN MOSCOW

THE SOVIET UNION last night gave its implicit endorsement in major economic and political concessions by Mr. Edward Gierek, the leader of the Polish Communist Party, aimed at ending Poland's labour crisis.
 The Government newspaper Izvestia yesterday, reporting approvingly on Mr. Gierek's proposals, gave the most detailed account of the workers' action in Poland yet in the Soviet Press and

acknowledged that Poland was gripped by a "serious economic and political crisis."
 But it made no mention of the Polish Government's agreement to free elections to the nation's trade unions. The Soviet news agency Tass, in a separate commentary which appeared to preface the Soviet propaganda line on the issue, accused the West of trying to exploit the crisis in Poland and undermine socialism "from within."
 The Soviet Press has shown extreme reticence about the events in Poland but the article in Izvestia and the accompanying Tass commentary appeared to indicate that the Soviet authorities were now prepared to back Mr. Gierek's changes while depicting the strikes themselves as of benefit to the West.
 Izvestia said Mr. Gierek had noted in his speech that a

French ports truce ends

BY DAVID WHITE IN PARIS

BLOCKADES were back at the French Channel ports yesterday after a partial truce at the weekend. The fishermen's dispute, which the French Cabinet is due to discuss tomorrow, showed signs of deteriorating with a clash between police and demonstrators in Boulogne.
 The police used tear gas to disperse angry crowds there after fishermen held up refrigerated lorries to stop them leaving the harbour area.
 Mr. Alan Pitt, the P & O Channel services manager, said none of the company's ships would sail into Boulogne.
 "The credibility of fishermen in all French ports is now at zero. I am not prepared to put any of our ships into Boulogne at this moment," he said. This means all previously Boulogne-bound P & O ferries will sail to the Belgian port of Zeebrugge.
 The access channel, to the Antifer super-tanker port near Le Havre, was blocked by half a dozen trawlers, and navigation buoys were removed as the conflict went into its fourth week.
 After a warning of sanctions by M. Christian Bonnet, the Interior Minister, a navy gunboat and three tugs were reported to be preparing to free the harbour in a repeat performance of last Friday's rescue operation at Fos, near Marseilles.
 Some 150 riot officers were deployed around Antifer terminal, France's largest oil terminal, which handled 37m tons of oil last year.
 French refiners warned that the ports dispute could cause local shortages of some refined oil products within a few days.
 Channel ports were mostly closed again after being opened during the weekend. Calais and Boulogne were expected to be reopened after car and rail ferries were operating yesterday and Hoverspeed services were functioning normally.
 Dunkirk, Dieppe, Le Havre and Cherbourg were all closed down yesterday morning. Some 2,000 England-bound passengers

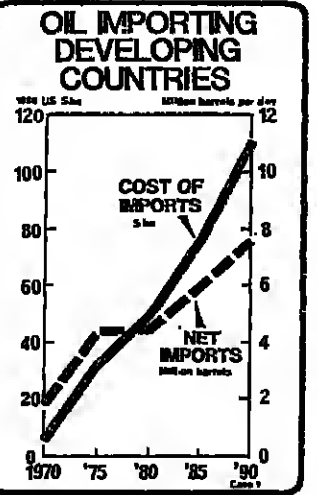
were unable to sail from Le Havre.
 St. Malo and Roscoff, in Brittany, were the only ports still open to cross-channel ferries.
 The situation in Fos, another French oil terminal, was tense as the navy kept the entry free. A call by the Communist CGT union for a solidarity strike by dockers and other workers in the Marseilles region had a mixed following. The Mediterranean port of Set was blockaded again.
 M. Raymond Barre, the Prime Minister, who returned to Paris from holiday yesterday, said in a newspaper interview that the Government intended to ensure free movement in French ports and he would not show "the least weakness." There were ulterior political motives behind the conflict he said.
 A second meeting of the National Conciliation Board in Paris to discuss the labour dispute involving Boulogne trawlers was suspended when the CGP union's representative walked out in protest against police intervention. Discussions centred on crew levels for trawlers of over 50 metres.
 Simultaneous talks were taking place between Government officials and representatives of Normandy inshore fishermen. This third meeting was expected to put the final touches to proposals drawn up on Saturday. These involve definition of fishing zones, import regulations and other points. The Government, however, is standing firm against the main demand, an increase in fuel subsidies.
 Local meetings on Saturday produced some progress on minor details, such as marketing arrangements and a clampdown on clandestine fishing. The CGT boycotted the meetings.
 M. Joel Le Theule, Transport Minister, whose department is responsible for fisheries is due to make a statement after Wednesday's Cabinet meeting, the first to discuss the issue. **Pilotage dues writ, Page 4**

World Bank considers plan to aid poorer oil-importing nations

BY DAVID BUCHAN IN WASHINGTON

THE WORLD BANK is floating the idea with its member governments and commercial lenders of setting up a separate affiliate which would invest up to \$25bn over the next five years in energy production in poorer, oil-importing countries.
 The new venture has the endorsement of Robert McNamara, the World Bank's president, in a foreword to a bank study on third world energy published yesterday.
 The report, a unique attempt to analyse the energy crisis in developing countries, says that their oil import bill will rise unchecked from \$50bn this year to \$110bn (in constant dollars) by 1990 unless they boost energy production. Such a trend would enormously complicate their task of financing an already large external debt.
 But by maximising energy production and conservation, the oil importing poor countries could cut their import bill by \$25-30bn in 1990, Mr. Robert McNamara, the bank's president, claims in support of its argument for a new energy bank.
 Last month the bank was given the go-ahead by the member government representatives on its board to explore the idea

energy development generally in Latin America, and some interest by OPEC oil producers.
 An energy affiliate would borrow from the private capital markets, as the World Bank does, or try to secure finance directly from surplus OPEC countries, though Saudi Arabia and Kuwait are involved in a quite separate dispute with the World Bank over whether the Palestine Liberation Organisation should be given official observer status at the World Bank's annual meetings.
 Mr. McNamara has sounded several New York banks on how the markets would receive a new Tel energy institution.
 "Nothing the commercial underwriters have said to the World Bank shows the idea is unfeasible," Mr. Stern claimed.
 The risk element would be quite small, he said. In a five-year, \$25bn lending programme, only \$3.4bn would go for inherently chancier jobs of surveying and test drilling for oil and gas in unexploited fields in the Third World.
 The energy affiliate idea is expected to draw first detailed reaction from member governments when their Finance Ministers convene in Washington for next month's annual



No sign of Times peace

BY PAULINE CLARK, LABOUR STAFF

THE FIRST-EVER strike by journalists on The Times goes into its fourth working day today with no sign of an early solution to the dispute over an arbitration pay award.
 But the journalists claimed yesterday in letters sent to national directors of the newspaper that arbitration officials had suggested "at least 10 ways" in which the deadlock over pay could be broken.
 The management of the paper and its three supple-

Istel warns Lloyd's of lawsuit

BY JOHN MOORE

ITEL CORPORATION of the U.S., the loss-making leasing concern, has warned that extensive legal action may arise over computer leasing insurance which it arranged at Lloyd's of London.
 Istel, which has been seeking a settlement with Lloyd's of about \$200m (\$94.53m) of its insurance claims, said discussions with underwriters "have progressed very slowly and have been marked by pronounced and varied disagreement between Istel and the underwriters."
 The warning was made as the San Francisco-based leasing company revealed that the weak end of its losses for 1979 were expected to be in excess of \$400m, while losses for the first six months of 1980 were running at over \$30m.
 Istel's insurance with Lloyd's represent about a quarter of Lloyd's total computer leasing insurance business of \$1.2bn. Computer leasing losses are expected to produce the largest series of losses in Lloyd's history: \$340m is Lloyd's official estimate, although unofficial estimates place the figure as high as \$800m.
 In order to keep the market's total losses down, Lloyd's has been seeking a negotiated settlement with Istel to avoid costly litigation.
 Istel estimated earlier this

year that its claims against Lloyd's could total over \$200m. Lloyd's underwriters were negotiating an unusual package which could have reduced the total losses that the Lloyd's market faced.
 Under the planned deal underwriters were seeking a payment in cash and assets (mainly computers) from Istel which would help offset the insurance claims.
 If concluded, this package would have represented a substantial extra premium to underwriters as the entire package was estimated to be worth \$100m to Lloyd's. Lloyd's underwriters would have gained the right to remarket the computers traded in under-insured leases, and possibly control over existing insured leases.
 In return underwriters would undertake to meet all of Istel's eventual insurance claims, which would have allowed Istel to repay a significant number of its creditors.
 Istel complained at the weekend of slow progress in its discussions with Lloyd's and noted its disagreement with the underwriters. Though the negotiations were continuing, the group was "uncertain as to whether a satisfactory settlement agreement will be reached."
 Istel stressed that if a final settlement with Lloyd's was not reached "in the near future, extensive litigation involving

International Monetary Fund and World Bank annual meetings.
 Whether a separate energy institution is needed may be questioned. On present plans, the World Bank intends to lend some \$13bn over the next five years for energy development. But this amount, Mr. McNamara says, "is some \$12bn short of what is both desirable and feasible." The bank staff argue that any expanded lending programme should be handled in a separate affiliate.
 Energy in developing countries **Page 2**

£ in New York

	Aug. 22	Previous
Spot	\$3,595.3605	\$2,8645.3655
1 month	1,471.41	1,301.25
3 months	1,471.41	1,301.25
6 months	1,471.41	1,301.25
12 months	1,471.41	1,301.25

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OVERSEAS NEWS

THE CRISIS IN POLAND

Reshuffle with little hope of change

BY CHRISTOPHER BOBINSKI IN WARSAW

THE EXTENSIVE changes made in the Polish Government and Communist Party at the weekend left the party leader Mr. Edward Gierk in charge but have removed those most identified with the political and economic policies which led to the present crisis.

The reshuffle has also eliminated those who over the past few days have been arguing against coming to terms with the striking workers on the Baltic coast who have been demanding independent trade unions since August 14.

The victory of the pragmatists in the leadership does not necessarily mean that the changes open a period of liberal policies. The fact that almost all the new appointees have at some time in the past held senior party posts shows that little effort was made to look for fresh talent.

Both the head of the Planning Commission, Mr. Tadeusz Wrzesniewski, and the chief of

propaganda policy, Mr. Jerzy Lukaszewicz, have been dismissed, as has Mr. Jan Szyslak, head of the official trade unions.

A speech by Mr. Gierk on Sunday at the central committee meeting which approved the changes included an offer of new elections to the existing trade unions. The tone of the speech showed a greater willingness by the authorities to concede strikers' demands.

Talks over the next few days will show if the credibility gap between the workers and the party can be overcome and whether agreement on the central trade union issue is possible. The top trade union post has been left open.

Mr. Stefan Olszowski, an ambitious figure known for his pragmatic approach who was himself ousted from the leadership last February, comes back to the Politburo.

Mr. Henryk Kisiel, till now Minister of Finance, has become a Deputy Premier and

head of the Planning Commission. Mr. Kisiel's appointment will reassure Western bankers who know and respect him and who are by now more worried than ever about the \$20bn debt which Poland owes to the West.

Mr. Kisiel's new post promises a period of moderate and sensible investment.

Mr. Marian Krzak, till now the Deputy Finance Minister who has played a prominent role in credit negotiations with Western banks, takes over at the Finance Ministry.

The appointment of the retired Mr. Jozef Pankowski as Prime Minister in place of Mr. Edward Bahiuch, who resigned after a mere six months in office, comes as a surprise. He is reputed to have taken a hard line towards Poland's private farming sector when he was in charge of culture in the party leadership. On the other hand his work in preparing ill-fated economic reforms in the

early 1970s would seem to qualify him for the leadership of a government which promises improvement. The combination of the two men is, perhaps, a guarantee that future changes will not go too far.

A significant appointment is that of Mr. Tadeusz Grabski, as Deputy Prime Minister. As party first secretary in Konin province in December 1978, he made a speech at the central committee meeting criticising the leadership for the economic situation.

The speech, which expressed the frustration felt by local officials at the degree of centralisation in the country, cost him his job and he was demoted last year to become a factory manager in Poznan. However, his offending speech also criticised the leadership for its tolerant policies towards dissidents and the Catholic Church. That would appear to be another indication that the present changes do not signal



Edward Gierk: a conciliatory tone.

liberal policies.

Both the head of the Price Commission and the Essential Statistical Office have been dismissed, as has the head of radio and television.

Mr. Jozef Barecki, editor-in-chief of the main party daily, Trybuna Ludu comes in to head the broadcasting media.

Russians given only the barest details

BY DAVID SATTER IN MOSCOW

WITH DISCUSSION of events in Poland spreading rapidly among ordinary Soviet citizens, the official Soviet media has issued only the barest details of the crisis there, and no information at all about the Polish offer to allow free trade union elections.

However, enough information from all sources is getting through to generate discussion even among workers waiting in evening lines outside Moscow's food and liquor stores.

With Western radio broadcasts largely jammed—but occasionally audible—Soviet citizens have been forced, by and large, to rely for information predominantly on the official press, which has characterised the Polish strike movement as "work interruptions."

The Soviet media has made only three references to the crisis in Poland since it began last month, and there has yet to be an explanation of the workers' grievances, any indica-

tion of what they are seeking, or any reference to how many are involved.

Soviet citizens received their first clear indication of the seriousness of the situation in Poland yesterday when the central newspapers published a despatch from Warsaw by Tass, the Soviet news agency.

The despatch reported the resignation of Mr. Edward Bahiuch, the Polish Prime Minister, two other Polish Politburo members and two candidate members.

The jamming of the Western radio broadcasts was a serious step which had not been prompted even by the Soviet invasion of Afghanistan, and it reflects the political sensitivity of reports of worker unrest.

W. Berlin warning to strike leaders

BY LESLIE COLT IN BERLIN

A WARNING has been given by West Berlin Communists that the "so-called workers' strike" in Poland is "trying to destroy the Socialist foundations" of Poland and to remove it from the Socialist community.

The charges, reflecting the fears of orthodox Communist officials in East Berlin and Moscow, are the most serious to be levelled so far against the Polish strike leaders.

The charges are almost identical to those made by East Germany and the Soviet Union against the Czechoslovakia's reformed Communist Government before the Soviet invasion of Czechoslovakia in August, 1968.

They reflect the fears of orthodox Communists that Mr. Gierk is running behind events.

The alarm is sounded in Die Wahrheit, the newspaper of the West Berlin Communist Party, an offshoot of the East German party, which is often used to express the views of the East German leadership.

Die Wahrheit says that in reality, the spokesmen of the striking Polish workers are "dissidents." These "dark elements" have launched a "step by step" plan to destroy the Socialist foundations of people's Poland.

The newspaper warns that the strike leaders also want to "abolish the principle of democratic centralism." This is a reference to the Gdansk United Strike Committee's demand for free trade unions.

Czech troops arrive for manoeuvres

TROOPS from Czechoslovakia and Bulgaria have begun arriving in East Germany for next week's Warsaw Pact manoeuvres, code-named Castleship in Arms '80, say Berlin Correspondents.

The exercises, involving 40,000 troops, will include naval units from the Soviet Union, East Germany and Poland, which are to practise landings on the Baltic sea coast.

Sadat to renew call for autonomy summit

By Alan Mackie in Cairo

PRESIDENT Anwar Sadat of Egypt is to repeat his call for a three-way Camp David-style summit to follow the United States presidential elections in November so as to get the suspended Palestinian autonomy talks moving again.

The offer, made first in his recent exchange of letters with Mr. Menachem Begin, Israel's Prime Minister, received a cool reception from the Israeli leader and from President Carter, both of whom want the talks to restart as soon as possible.

In an interview with the Israeli newspaper, Maariv, President Sadat ruled out early resumption of the talks, which he suspended indefinitely earlier this month in protest against Israel's formal annexation of east Jerusalem and against its West Bank settlements policy. He said then that both sides need a cooling off period of a few months to rethink their positions.

Israel and EEC in clash over absent attaches

BY DAVID LENNON IN TEL AVIV

THE ABSENCE of four European Community military attaches from Israel's manoeuvres on the Golan Heights last month, has caused a row which highlights the growing strain in relations between Israel and Europe.

Israel regards the absence of the British, French, German and Italian attaches as a political boycott, and the army has threatened not to invite them to attend future manoeuvres in the occupied territories.

Gen. Yehoshua Saguy, director of military intelligence, called in the attaches last week, to ask about their absence. An army official claimed yesterday that the attaches had said they had stayed away from the Golan manoeuvres on instructions from their ambassadors.

But at least one ambassador denied this and stressed that no co-ordinated political decision had been taken by the EEC countries to boycott military exercises.

The Jerusalem Post reported, however, that EEC diplomats had explained to Israel that the

attaches' absence from the manoeuvres reflected the general dissatisfaction of their Governments with Israeli policies.

The Foreign Ministry in Jerusalem yesterday said that the affair of the absent attaches was "not a diplomatic issue" as far as Israel was concerned. But EEC diplomats questioned this, pointing out the "curious time-lag" between the manoeuvres, almost a month ago, and the decision to call in the attaches last week.

Israel is angry with Europe over the EEC declaration at Venice in June, which called for Palestinian self-determination and participation by the Palestine Liberation Organisation in the peace negotiations.

Meanwhile, Israel is braced for further clashes with Syrian forces following a dog-fight over south Lebanon on Sunday, in which one Syrian MiG-21 was shot down by Israeli aircraft.

Senior officers in Tel Aviv said yesterday they were uncertain whether the clash indicated a possibly greater Syrian involvement in the warfare

Carter line on reflation wins support

By David Buchan in Washington

SUPPORT for the Carter Administration's measured approach to reflation of the U.S. economy has come in a report from an important congressional committee, which also endorsed production-oriented tax cuts, popular among Republicans.

The Joint Economic Committee gave a warning that traditional anti-recession moves were not only ineffective in influencing the course of the last six downturns in the economy since the Second World War, but because of delays in enacting tax cuts and speeding up public works, came too late and overstimulated the recovery.

This view squares with the Administration's argument. But the committee, made up of Democrats and Republicans from both Houses of Congress, also reflects the growing consensus among both parties that a 1981 tax reduction should focus as much on generating business investment as on income tax relief for individuals.

Bonn 'may cut deficit to £4bn'

BY JOHNATHAN CARR IN BONN

WEST GERMANY may be able to cut its current account deficit next year to about DM 20bn (£4.4bn) compared with DM 27bn this year, according to a new report by the IFO Economic Institute of Munich.

But, the institute adds, that it is not certain that the 1981 deficit will be any easier to finance through capital imports than the 1980 one, and urges that further efforts should be made to save on imported oil.

The institute also says that West Germany will have to

consider whether it can continue to make payments abroad—to the European Community, for example—in as great measure as in the past.

The institute's prediction is important because the organization was among the first to forecast correctly West Germany's plunge into current account deficit. After a surplus of DM 17.5bn in 1978, the country had a deficit of DM 10.1bn last year and one of DM 12.3bn in the first half of this year.

Although the Bonn Govern-

ment is not considering cutting its payments to the EEC, it is determined to reduce their rate of increase. The institute's forecast fits well into the pattern of argument the Government is likely to use.

One key reason for the increasing current account deficit in the first half of this year has been the further worsening of West Germany's terms of trade, with import prices, particularly of oil, up by an average 18.5 per cent, and export prices up by only 7 per cent.

Tripoli-Malta quarrel halts oil search

BY RUPERT CORNWELL IN ROME

A NEW EPISODE in the squabble between Libya and Malta over territorial waters has forced the Salpem Two exploration vessel, owned by ENI, the Italian state energy corporation, to abandon oil drilling operations off the Medina Bank, part of the Maltese continental shelf.

Trouble began earlier this month when the Salpem Two, operating under contract for the Texaco oil group, which had won the exploration permit from the Valletta Government, began drilling off the bank, about 50 miles south-east of Malta.

About a week ago it became subject to harassment from Libyan vessels including a submarine. Finally, an officer from a Libyan frigate went aboard the Salpem to tell its captain that Tripoli did not accept

Malta's right to explore the shelf.

The incident is the latest in a conflict between Malta and Libya over exploration rights in the southern Mediterranean and follows an abrupt worsening of relations between the two countries. Tripoli has refused to recognise a ruling on the dispute from the International Court of Justice at the Hague.

ENERGY IN DEVELOPING COUNTRIES

David Dodwell reports on the World Bank study of the Third World's energy problems

Improved efficiency will cut crippling fuel costs

A BAN on parking in 39 streets in Bangkok, which has reduced traffic jams in the centre of this notoriously congested city, is saving drivers about 150,000 litres of petrol a day—a saving for the Government on its oil import bill of about \$22m a year.

With measures like this, and many others, mainly in industry, transport and electricity generation, developing countries could save a total of \$25-30bn a year on their energy import bills by 1990. Instead of consuming about 30.6m barrels of oil equivalent a day (bode) consumption could be cut by 15 per cent to 26m.

The developing countries account for only a small part of total world commercial energy consumption—about 12 per cent this year (16.7m bode from a total of 137.8m bode) and an estimated 15 per cent in 1990 (30.6m bode from a total of 201.5m bode). But recent oil price increases have hurt them more than any other group.

In the past 10 years, the cost of their oil imports has soared ten-fold, and can be expected to double again by 1990. With their infant industries, limited borrowing capabilities and already-high debt burdens, this is a cost few are economically sturdy enough to cope with.

The World Bank notes that the developing countries are in one sense lucky: "They are less committed to a capital stock and life style evolved in an era of

cheap coal and oil," it says—so they are perhaps more easily able to adjust to the new era of high cost energy.

The very fact that they are "developing" makes it more difficult to curb demand for oil. "Their economies are growing faster than those of the industrialised economies," the report says. "Demand for commercial energy, with the rapid growth of cities, industries, motorised transport and other energy-intensive developments, is growing faster than GNP."

Just 17 countries account for 85 per cent of all the commercial energy consumed in the 121 countries listed by the World Bank as part of the "developing world." The others consume so little that for development to occur at all they must rapidly increase their energy consumption regardless of cost.

It is essential for such

countries not only to save on costly energy imports (by developing their own resources where possible) but also to use commercial energy as efficiently as possible. The World Bank identifies three crucial areas for energy saving:

● Industry: this accounts for 35 per cent of all the commercial energy consumed in the developing countries. Fourteen countries absorb most of this—prominent among them Brazil, Korea, India, Mexico and Romania—because they have become major producers of energy-intensive industrial products like steel, cement, ammonia, copper, aluminium, pulp and paper and fertilisers.

The World Bank claims "simple changes" could bring quick savings—like better recovery of by-products, installation of waste-heat boilers, better insulation and better

bearings. Investment in retrofitting and attention to other energy-saving techniques could, with the "simple changes," trim energy needed by 10 per cent in 1985 and by 15 per cent in 1990. This would bring a saving in that year of about 1.3m barrels of oil worth \$18m, and would trim the energy import bill of developing countries by 17 per cent.

Biggest savings are possible in the cement industry and in the pulp and paper industry, where efficiencies could cut consumption by up to 25 per cent. Savings of up to 20 per cent are possible in petroleum refining, the World Bank says.

● Transport: this accounts for between 10 and 25 per cent of energy consumed in developing countries, most of it on road transport. The World Bank estimates savings of up to 1m b/d are possible—worth \$11bn this

year and \$25bn in 1990—which would trim the oil import bill by 10 per cent.

The use of more efficient engines in cars, buses and lorries would help (the use of ethanol, produced from sugarcane, in petrol in Brazil attracts attention). So would the use of coastal shipping, river transport and railways for bulk cargo carriage.

● Electricity: this accounts for about 25 per cent of commercial energy consumed in developing countries. By 1990 it will account for 30 per cent and the cost of oil for power generation is likely to be \$30bn.

Energy losses are estimated to average up to 6 per cent in power generation, and up to a further 15 per cent in transmission and distribution. In certain countries, losses are much higher. In India, for example, power stations rarely operate at more than 50 per cent of installed capacity. Random load-shedding and regular power cuts inflict untold cost on the economy.

To developing countries as a whole, more efficient operation could cut 7 per cent from installed generating capacity needs by 1990, saving \$20bn in capital investment, and about \$2bn a year in fuel bills.

Shifts from oil-fired to coal-fired power generation, with the establishment of national grids, and exploitation of hydro and nuclear power where suitable, would allow further savings.

Five-fold rise urged in forest planting

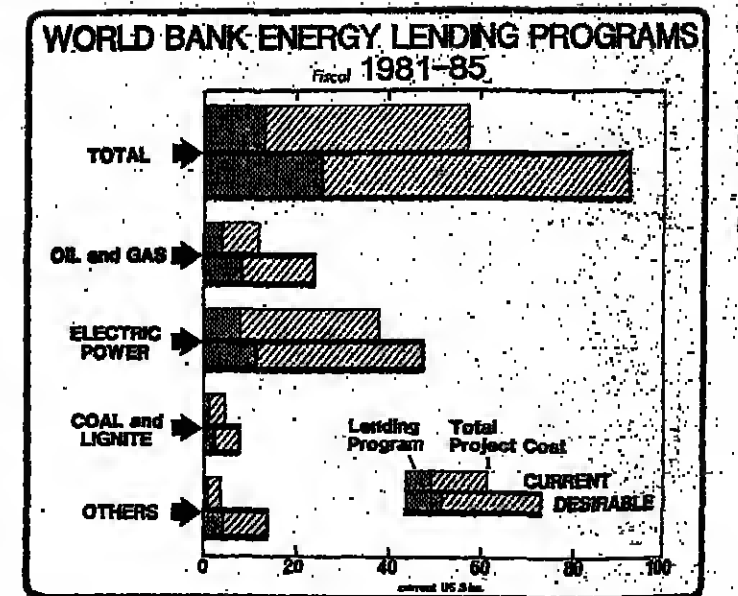
MORE THAN 10m hectares of forest go up in smoke every year in the developing world, where 2bn people use wood as fuel for cooking and heating.

The depletion is so rapid that the World Bank is calling for a five-fold increase in forest planting in the next 20 years.

If all these people now using "traditional fuel"—which would also include dung—were to switch to oil, demand for oil in the developing countries would evidently leap by at least 2.5m barrels a day, adding about \$30bn to their annual oil-import bill.

Many developing countries thus face a "double energy crisis"—how are they to curb depletion of forests and soil fertility without unduly stimulating the import of expensive oil?

The World Bank proposes installing small hydro-electric stations; encouraging use of renewable energy like methane "fermented" from animal wastes, or solar energy as a means of lessening the crisis. It suggests a "desirable programme" of loans worth \$1.1bn to be spent on tackling the wood fuel crisis over the next five years.



Separate body may try to ease energy crisis

THE WORLD BANK may decide by the end of the year to establish a separate energy affiliate to cope with the "energy crisis of major proportions" facing many developing countries. The decision on whether or not to go ahead hinges on:

- The size of lending programmes for energy projects in the coming five years, covering oil, gas, electric power and renewable energies like firewood, sugar alcohol or methane;
- The size of additional funds coming from new sources—perhaps member states of the Organisation of Petroleum Exporting Countries and the Organisation for Economic Co-operation and Development.

The World Bank is by far the largest official agency offering finance for commercial energy development: in 1980 it lent about half of the \$63bn committed by multilateral agencies. But this is only a small proportion of total investment needs, estimated at \$26bn this year and around \$28bn a year in the late '80s.

At present, it predicts commitments over the coming five years totalling \$15bn. But "a substantially larger programme would be both feasible and desirable"—so it outlines plans for a "desirable programme" involving an extra \$12bn.

Investment programme of \$500bn needed to develop untapped resources to

DEVELOPING countries have vast and barely tapped energy resources of their own, and the transition into an era of high-cost energy makes it imperative that they exploit them as soon as possible.

For example, net-oil importers in Africa, Asia, Latin America and the Middle East have proven oil reserves of 7.2bn barrels—and ultimately recoverable reserves of perhaps 53bn barrels. Research has never been carried out to pinpoint these vast untapped reserves.

"The vast majority of the import dependent countries has been explored at best superficially," the World Bank says. "Enough to determine that large, easily exploitable reserves are not present, but not enough to establish whether there are smaller deposits that could make an important contribution

to their own energy supplies." These resources—which include oil shale, tar sands, coal, natural gas and many other renewable supplies—have been neglected through the years of cheap oil, mainly because:

- The seismic and geophysical surveys needed to pinpoint supplies were too costly in view of the comparatively small estimated reserves of oil.
- Difficult terrain or complex geological structures made exploitation uneconomical.
- The reserves were not exportable (most oil companies have an overriding interest in export rather than domestic consumption) because they were too small, or too cumbersome (coal), or technically difficult to transport (natural gas or tar sands).
- Technologies did not exist to exploit reserves at any reasonable commercial cost.

oil or solar energy). Even now, exploitation of these resources may appear staggeringly expensive—the World Bank is calling for an "expanded energy programme in the oil importing developing countries" over the next decade involving investment of between \$450-\$500m.

In the World Bank's words: "In the great majority of cases, substantial savings would be gained by substituting domestic sources for imported oil."

Investment spending on the order of \$40-\$60bn in 1980 dollars during the decade is large in relation to spending in recent years, but is about equal to the sum which the oil importing developing countries will spend in 1980 alone on imports of oil (almost \$50bn). This sum is predicted to rise to \$11bn in 1990.

Bank says these countries

"would be well advised" to mount "as large a programme of oil exploration and development as their managerial, technical and financial resources permit." At present, 20 developing countries produce about 2m barrels of oil a day, but appropriate investment could lift this to 2.5m by 1990, with oil from current non-producers lifting the overall output to 3.6m barrels.

The need for action is most urgent among those countries most heavily dependent on oil imports. Over 60 developing countries import oil to meet 76 per cent or more of their energy needs—among them Portugal, the Philippines, Thailand, and Sri Lanka.

Some countries are already increasing oil production, and seem headed for self-sufficiency—most notably Chad, Ghana, Ivory Coast, and Pakistan.

Others, like Argentina, Brazil, Chile and Turkey, once snubbed private oil companies but are now actively seeking their help in the search for oil.

Countries which have old and declining oil fields are called upon by the Bank to "enhance" recovery using latest improved technologies. Canada and the U.S. will get between 30-50 per cent of their future oil from "enhanced recovery," the Bank says.

Natural gas will soon play an important part in oil import substitution. Algeria, Argentina, Bangladesh, Colombia, Mexico, Pakistan and Romania already use gas for domestic needs, while Indonesia, Nigeria and Malaysia could increase domestic use instead of increasing exports of liquid natural gas. While it is more difficult to transport than oil, gas is abundant, with proven reserves

three-quarters of those for oil. Already natural gas is talked of as "one of the cheapest options" in developing countries, and by 1990 it could account for 10-12 per cent of world consumption. At present much is wasted: in 1978, 1,385m barrels of oil equivalent were simply flared off—about 40 per cent of production.

Coal is likely to make an increasingly important contribution to domestic energy needs in the next two decades, reversing the trend of the past 50 years, in which coal fell from 59 to 29 per cent of world energy production.

The World Bank estimates that coal will provide between half and two-thirds of the world's additional fuel up to the year 2000, with costs often about 40 per cent less than oil. Total recoverable reserves are at least five times those of oil.

In spite of the ecological and transport problems associated with coal mining, output can be expected to double in the next 20 years, with trade multiplying 15-fold.

At present there are just 25 producers in the developing world, with nine accounting for 90 per cent of output (Brazil, Colombia, India, Korea, Mexico, Romania, Turkey, Vietnam, and Yugoslavia). But another 23 countries are known to have reserves, and many of these are likely to begin production for domestic use in the near future.

The World Bank calls for investment totalling \$175-\$350bn over the next decade for new mines, transport links, ports and ships to meet expected demand.

Many new and renewable energy sources are likely to come into use in the decade ahead. Alcohol made from

sugar cane, molasses, sorghum or cassava shows "great" as an "additive" in petrol (already in use in Brazil), while plans for solar and wind power are well advanced.

In electricity generation, nuclear and hydro-electric power may soon be cheap compared with oil, and many governments—like Korea and Taiwan—aim to reduce oil imports by developing this potential.

All of these sources would not long ago have been regarded as uneconomical. Today, some of them are still comparatively expensive, but with the relentless rise in oil prices, this is unlikely to remain the case for long.

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German food sales to UK climb to record levels

BY DAVID CHURCHILL, CONSUMER AFFAIRS CORRESPONDENT

SALES of West German food and drink in the UK are expected to reach record levels this year at a time when the overall growth in the UK food market remains static.

Figures just released by the Central Marketing Organisation for German Agricultural Industries (CMA) reveal that imports of West German food and drinks increased by 18 per cent last year to reach a record 975,000 tons worth about £600m at retail prices. This represents a ninefold increase on German food and drink sales since the early 1970s.

Although no official figures are yet available for 1980 sales, estimates within the grocery trade suggest that the volume of imports will comfortably exceed last year's growth rate. This means that UK imports will exceed 1m tons for the first time and seriously challenge Italy, Holland and France who are at present ahead of the UK in the league table of German food and drink imports.

However, the UK has already become the largest market in the world for German beer and wines. In spite of the challenge

from German-type lagers brewed and marketed under licence in the UK, imported German beer increased in volume by 12 per cent last year to reach 143m pints. Only Guinness from Ireland is imported in larger quantities.

Last year imports of German wines rose by 45 per cent to reach 458,000 hectolitres (about 10m gallons) which meant that the UK overtook the U.S. as the largest foreign market.

The most popular German food product, however, remains butter which has over 7 per cent of the total UK butter market. German cheeses are also increasing rapidly in popularity along with all types of German speciality foods, such as cooked meats and sausages, sweet and savoury biscuits and confectionery.

The growth in popularity in the UK of German foods in particular is even more surprising given that British households are spending proportionately less of their budgets on food and that food sales in real terms have remained virtually static throughout the 1970s.

The reasons for the growth of German foods, however, are

threefold.

First, the prices of its food and drink products have become more competitive as a result of the UK joining the EEC. This meant that tariff barriers were reduced and led to a rise in domestic food prices to bring them in line with other EEC countries. In the past two years the high value of sterling and the low German inflation rate have made German food prices even more competitive.

Second, the UK's highly efficient food distribution and retail network makes it comparatively easy for German producers to penetrate the UK market. Once major supermarket multiples such as Tesco and Sainsbury were willing to sell German food and drink products, it meant that German foods now have virtually national coverage with other grocers eager to jump on the bandwagon.

The third reason is the activities of the CMA in promoting both the concept and German food and drink in the UK and working closely with UK retailers and German food processors.

Philippines to resume nuclear programme

MANILA—Mr. Cesar Virata, the Philippines Finance Minister, said construction of the country's first nuclear power plant will resume shortly.

He told foreign correspondents the Government was satisfied with extra safety features for the plant, to be built on the Bataan Peninsula west of Manila Bay. Construction of the \$1.75bn plant was suspended last year following the accident at the Three Mile Island nuclear power station in Pennsylvania.

Last May, the U.S. Nuclear Regulatory Commission granted permission for Westinghouse Electric to export a nuclear reactor to the Philippines. Mr. Virata said construction work is expected to be completed by the end of 1984. He said there would be substantial overrun on costs, which he estimated at between \$600m and \$700m. Earlier estimates placed the cost of the project at \$1.2bn. He said some of the extra cost would be borne by Westinghouse, but declined to give details.

PLESSEY'S ILL-FATED IRAQI BID

Executives breathe a sigh of relief

BY PAUL CHEESERIGHT AND MARGARET HUGHES

DESPITE PUBLIC lamentations about Plessey's apparent failure to win a £400m contract to establish an electronics industry in Iraq, some group executives have actually been heaving a sigh of relief.

The indications over the past week have led to the conclusion that the UK group has been thwarted by Thomson-CSF, one of the leaders of the French electronics industry, which is thought to have put together a package more closely aligned to the very strict conditions demanded by the Iraqi Government.

Plessey's attempt to win the contract have been accompanied by intense soul-searching within the group. The deal, involving construction and the supply of plant and training facilities, is different from contracts it has undertaken in the past. Further, Iraq is considered a difficult market.

But more importantly, and this was the crucial area where Plessey's bid floundered, the Iraqi Government has made

demands which have taken the level of risk above what some in the group have thought tolerable.

Of course, Plessey's level of tolerance is influenced by its assessment of what shareholders will accept and by the degree of support forthcoming from the Government in general and the Exports Credits Guarantee Department (ECGD) in particular.

It has been evident that the ECGD, while perfectly willing to support a commercially viable bid, was not prepared to be left holding all the financial responsibilities by providing cover over non-commercial risks.

Plessey has been in touch continually with the Department of Trade and the ECGD, but in the final analysis the two sides could not find a mutually acceptable balance of risks and costs.

The difficulties all arose from the Iraqi demand that Plessey assume total liability for the project—that is, the group should be financially

responsible not only for the work in which it is directly involved but for all the sub-contractors as well.

Springing from this the Iraqis required high performance bonds—written guarantees supplied by the contractor for the performance of contractual obligations. But these bonds would be payable on demand from the Iraqis.

Such demands are common in the Middle East, although the requirements in Iraq are at the stringent end of the scale. Some companies are more prepared to run the risk of the requirements than others.

Plessey clearly found them intolerable without a greater degree of official support than was forthcoming.

Plessey's needs from the ECGD ran through the normal demands for an export contractor—cover for overseas borrowings, supplier credits, and bonding—and then into the special areas where the Depart-

ment of Trade becomes involved and where the ECGD's appraisals are not merely technical.

This involves what the ECGD calls Joint and Several Cover, a so far unused facility which indemnifies the main contractor when a sub-contractor defaults. The ECGD will cover 80 per cent of the admissible losses up to a total of 20 per cent of the total UK value of the whole project contract.

But the cover is expensive, carrying a premium of £2 per £100 of the total UK contract value after the deposit of a non-returnable £5,000.

At the same time Plessey apparently sought cover against the insolvency of any of its sub-contractors. Again the premium is not cheap at 1.5 per cent a year of the maximum liability.

It was on the negotiation of such provisions that Plessey and Thomson-CSF, which Plessey and ECGD appear to have reached a parting of the ways.

Brazilian blow to Rolls-Royce

BY MICHAEL DONNE, AEROSPACE CORRESPONDENT

ROLLS ROYCE has lost its position as the sole engine supplier to the new Boeing 757 twin-engine jet airliner.

Transbrasil, the Brazilian airline, which is buying five Boeing 757s for delivery from 1983, has specified the U.S. General Electric CF6-80 engines for the airliner.

Hitherto, the new Rolls-Royce RB-211 Dash 535 has dominated Boeing 757 sales, to British Airways and Eastern Air Lines.

General Electric said that it is also now negotiating for another airline to fit its engines.

in its 757s—Aloha of Hawaii. The Transbrasil deal is worth \$30m (£12.7m). Rolls-Royce has always accepted that sooner or later the other big major engine manufacturers, GE and Pratt & Whitney, would win sales for their engines in the Boeing 757, and it will consider that it is doing well if it can capture around one-third of total 757 sales with the Dash 535 engine. The total market for 757s is expected to be over 1,000 aircraft.

General Electric also announced that it had signed an

agreement with Alfa Romeo of Italy whereby the latter will make under licence the GE T-700 turbo-shaft engine for Italian and other helicopter programmes.

● Ansett Airlines of Australia has placed a A\$45m (£22m) engine order with General Electric. Reuter reports from Melbourne. Ansett has ordered a total 15 CF6-80A engines to power the five Boeing 767 aircraft it has on order in preference to the Pratt and Whitney engine option.

CGE wins £44m cable order

By David White in Paris

THE CONTRACT for the first part of a 4,000-mile undersea telephone cable linking Brazil with Europe has been won by Compagnie Generale d'Electricite (CGE), the French electrical group, against strong international competition.

Worth FF4 430m (£44m), the contract is the biggest that CGE has obtained in this field.

The new telephone system is due to go into service in mid-1982.

SHIPPING REPORT

Slight drop in coal costs

BY OUR SHIPPING CORRESPONDENT

SOME of the bloom has gone off the buoyant coal trades. The Australian coal miners' strike continues, but heavy congestion at the main U.S. coal port of Hampton Roads has stemmed the rise in freight rates, temporarily at least.

The Hampton Roads/Japan rate has fallen back from \$27 per tonne to around \$26.50. This has spilled over into the larger grain carriers and rate for 50,000-60,000 tonnes have softened in sympathy. However, the market is consolidating its earlier rises and brokers are not expecting it to fall much further over the next couple of weeks.

A clue to the strength of the

dry cargo markets at present is the increase in time charter activity which indicates that charterers are anxious to cover their forward commitments before freight rates rise further.

Galbraith Wrightson reports that the Far Eastern market for larger sizes has continued to improve and the handy size Atlantic tonnage has also shown more momentum. Denholm Coates reports that the going rate for handy-sized vessels at the moment is \$3,500-\$3,750.

The Chinese continue to charter tonnage steadily, but Russian activity, according to Denholm, is cloaked in "more than usual secrecy."

World Economic Indicators

WORLD ECONOMIC INDICATORS

TRADE STATISTICS		July '80	June '80	May '80	July '79
UK £ bn	Exports	4,032	4,010	3,973	3,600
	Imports	3,771	4,027	3,991	3,600
	Balance	+0,261	-0,017	-0,018	-0,000
France Fr bn	Exports	40,974	40,743	38,328	34,296
	Imports	47,439	46,580	45,558	37,875
	Balance	-6,465	-5,837	-7,230	-1,579
U.S. \$ bn	Exports	18,642	17,878	18,468	15,038
	Imports	20,922	20,528	19,308	16,937
	Balance	-2,280	-2,650	-0,840	-1,899
Holland Fl bn	Exports	11,889	12,148	12,549	10,889
	Imports	13,543	12,672	12,693	11,189
	Balance	-1,654	-0,524	-0,144	-0,300
Italy Lira bn	Exports	5,704	5,575	5,411	5,228
	Imports	6,715	7,068	6,921	5,223
	Balance	-1,011	-1,513	-1,510	-0,005
Japan Yen bn	Exports	10,800	10,298	9,892	8,529
	Imports	10,670	10,962	10,723	7,473
	Balance	+0,130	-0,664	-0,831	+1,056
Germany DM bn	Exports	28,50	28,90	30,14	25,8
	Imports	28,20	28,60	29,04	24,1
	Balance	+0,30	+0,30	+1,10	+1,7
Belgium Fr bn	Exports	149,400	155,700	137,800	124,327
	Imports	185,900	181,768	152,600	128,160
	Balance	-16,500	-26,068	-14,800	-1,833

Lister plans Bangladesh plant

BY OUR WORLD TRADE STAFF

R. A. LISTER, the Hawker Siddeley subsidiary, is to set up a diesel engine manufacturing plant in Bangladesh. The plant will be established in partnership with private sector Bangladesh interests.

Talks are taking place about the plant's capacity, after which it will be clearer what size of capital investment will be involved. The plant will seek initially to satisfy local demand and later to sell abroad.

Orders are expected first from the private sector and

then from publicly-funded irrigation projects. Components will be supplied from the UK after the plant starts operation, but the local content of manufacture is expected to grow progressively.

Since 1976, Lister has supplied 2,000 diesel engines to Bangladesh, and has recently received a £2.4m order for a further 1,670 engines.

● Avdel, a part of the Newman Industries Group, has won a £1.5m order from Stankoinport of the Soviet Union under

which it will supply machine tools, plant and equipment for the manufacture of self-plugging rivets. The order includes the supply of production tooling for an estimated five years' production programme.

● Frederick Parker, the Leicester-based construction plant manufacturers, is to supply a plant worth approximately £1m for road works in Bolivia. The order was placed by the Government Servicio Nacional de Caminos and is being financed by the World Bank.

COMPANY NOTICES

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LONDON BRANCH
US\$ 20,000,000

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Extendible at the Certificate holder's option to 20th August, 1984

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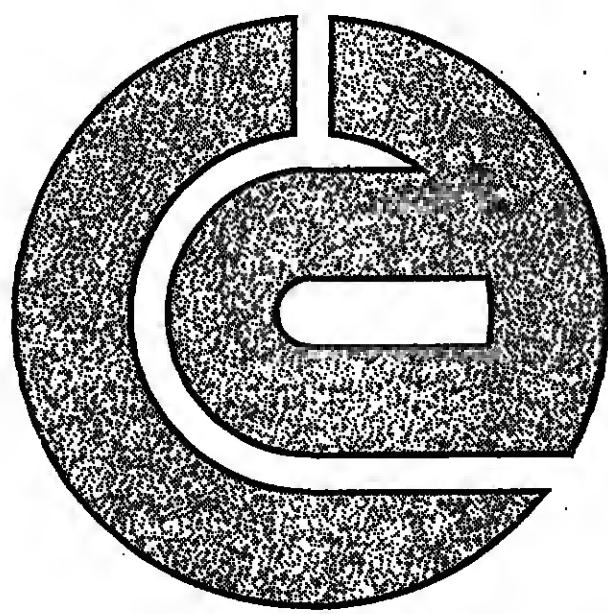
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UK NEWS

CBI close to picking Methven successor

By John Elliott, Industrial Editor

LEADERS of the Confederation of British Industry hope to choose a new director general to succeed the late Sir John Methven within the next five weeks.

A short list of about six names has been drawn up by Spencer Stuart, the company which has been searching for candidates during the past three months, and interviews are to start within a few days.

Most of the candidates are currently working in industry or commerce and it seems that someone from this immediate background is most likely to be chosen.

This means that Mr. Brian Righy, one of the CBI's two directors general, is not generally regarded as the favourite candidate, even though he is thought to be on the short list. He joined the confederation from Laporte Industries only two years ago.

Leaders of the CBI are pleased with the calibre of people on their short-list and expect to choose a candidate after interviews, which will be conducted by Sir Ray Pennock, the CBI's president, Sir John Greenborough, the deputy president, and other senior industrialists in the confederation.

If this timetable is kept, the new director general would make his first major public appearance at the confederation's annual conference in Brighton early in November.

A salary of about £35,000 to £40,000 has been on offer, and Spencer Stuart has been looking for people with proven business experience, preferably aged 45 to 50, with direct experience of working in industry, and of dealing with Government, trade unions and the Press.

Sir John Methven was chosen in 1976 to lead an attack on Left-wing industrial policies and to build up the prestige and effectiveness of the CBI.

This time, one of the main qualifications is an ability to bridge the gulf between both sides of industry at a time when the Government and trade union leaders are not so close terms.

Land-Rover V8 range goes on sale

Financial Times Reporter

THE LAND-ROVER, one of the UK motor industry's great successes, enters a new phase of its 32-year life today with the 3.5 litre V8 engine, normally fitted on the Range Rover.

The V8 range marks the completion of the first phase of a £220m expansion programme by Land-Rover, a subsidiary of BL.

The new vehicle—already on sale abroad—is priced in the UK at £8,603 as a station wagon and £7,500 in pick-up form. It has permanent four-wheel drive, and several other features previously optional are made standard.

Mr. Mike Hodekinson, managing director of Land-Rover, said the V8 would enable his company to meet the demands of the market more precisely.

"I am confident it will enable us to consolidate our position as leaders," he said.

Sales are being aimed particularly at the Middle East where both cross-country reliability, and high performance on good road surfaces are required.

Aiwa names South Wales managers

By Jason Crisp

AIWA, the Japanese electronics company, yesterday announced its management team to run its South Wales hi-fi factory. The team will consist of Japanese and British nationals.

Production of miniature, stackable hi-fi units began seven weeks ago; 500 units a week are being produced and 50 people are employed. The factory, in Gwent, will supply all Europe and is Aiwa's second outside Japan.

In a year, production is expected to increase to 1,500 units. Aiwa also expects to start manufacturing hi-fi cassettes there. Aiwa is 52 per cent-owned by Sony in Japan.

The company's investment in Wales is about £1m.

HTV opera

AN OPERA, based on A Christmas Carol, commissioned and created by HTV, has won the major television opera award in the prestigious Salzburg Festival.

An unpaid bill could further disrupt Channel ferries, writes William Hall
Writ highlights unfairness of pilotage dues

A LONG-RUNNING dispute between foreign ferry companies and the UK pilotage authorities could come to a head later today when a writ, served on a French ferry for non-payment of pilotage dues, expires.

The unpaid bill of £12,564 is relatively small but the repercussions could be very serious. The ferry, the 3,473 grt Prince of Brittany, could be seized, and if this happens the owner, Brittany Ferries (which is controlled by Breton farmers), has warned that all UK ferry services into France would be halted.

Given the tense atmosphere in the French ports at the moment, there is a danger that such a move would be regarded by the French as retaliatory action. This would worsen relations between the two countries, already strained by the French fishermen's blockade of the Channel ports.

However, the dispute between the foreign ferry companies and the UK pilotage authorities

has been rumbling for a long time and it is coincidence that matters are coming to a head during the disruption of the cross-channel ferries.

For many years foreign ferry companies have felt aggrieved by the rule that they had to take on board a UK pilot when entering port, while UK companies were generally exempt.

Not only did it mean that they were put at a competitive disadvantage because they had to pay more than their UK competitors, but it also endangered their tight sailing schedules if they had to wait outside port for the pilot to arrive.

The foreign operators have been pressing for the law to be changed so that they could be put on the same footing as UK operators. The 1979 Merchant Shipping Act does in fact provide for the granting of pilotage certificates to EEC nationals, but so far none have been issued and the foreign ferry companies are becoming restive about the delay.

Earlier this summer a number of companies including DFDS, the Danish ferry operator, stopped paying their pilotage dues in protest at the delays in issuing foreign pilotage certificates. However, after the threat of legal action they backed down and only Brittany Ferries is still refusing to pay its full pilotage dues although it is taking pilots on board as legally required.

For several weeks the Prince of Brittany has not paid the full £269 pilotage dues charged for each of its trips into Portsmouth. Instead, it has paid the £38 which rival UK companies such as Townsend Thoresen pay.

The cheques have been returned and an Admiralty Court writ for non-payment has been served on the ship by Trinity House, acting on behalf of the local pilots at Southampton all of whom are self-employed.

At the heart of the dispute is the inescapable fact that

Britain's pilotage laws are out of date and irrational. They are based on the premise that pilots should be paid for when they are used.

Shipping companies that do not need pilots on entering UK waters do not pay for them.

This means that virtually the whole cost of maintaining a viable pilotage service around the country falls on the users. This sounds fine in theory but ignores the fact that pilots have to be provided on a 24-hour basis just in case a ship arrives at a port.

In addition a handful of foreign ferry companies are paying a disproportionately large share of the country's pilotage dues for a service they do not need. DFDS, for example, has been sailing into Harwich for over 100 years and its masters know the channels better than many Harwich pilots.

If the masters of foreign ferries are issued with UK pilotage certificates, earnings of

the pilotage authorities will drop and there will be less work for Britain's 1,800 pilots. Trinity House, which is the major UK pilotage authority, agrees that the rules are unfair and is working to change them.

However, it argues that the changes cannot be pushed through without the agreement of the pilots affected and this takes time. Meanwhile, the patience of the foreign ferry operators who believe they are being unjustly treated is fast running out.

Whatever the outcome of Trinity House's dispute with Brittany Ferries, there is a demonstrable need for completely revising the system of financing pilotage in UK waters.

Similar size ships should pay the same dues irrespective of whether they need the services of a UK pilot. A pilotage service has to be provided to ensure the safety of shipping generally, and its costs need to be borne more equitably by the shipping community.

City split on single-figure inflation

BY PETER RIDDELL, ECONOMICS CORRESPONDENT

CITY economists are divided about the possibility of reducing the annual rate of retail price inflation to single figures by the end of next year.

In their latest market review, Phillips and Drew, the stockbrokers, estimate that the 12-month rate will be about 17 per cent at the end of this year and between 12-13 per cent at the end of 1981.

This assumes that the growth of labour costs will slow from 18 to 14 per cent over the period, and that the mortgage rate will decline by three percentage points (which alone will reduce the retail prices index by 1.1 per cent).

In addition, oil prices are expected to be more stable, and these favourable factors will offset the possible absence of any further benefits from a

squeeze on retailers' profit margins.

Phillips and Drew say that pay increases would have to drop to between 8 and 9 per cent if a single-figure inflation rate is to be achieved by the end of this year. The firm says this outcome seems most unlikely.

In contrast, brokers James Capel have forecast that the annual inflation could drop to just under 10 per cent by the end of 1981.

A cautious view of the general outlook on inflation in industrialised countries has been put forward in the latest review from Amex Bank, part of the American Express group.

It is argued that the rate of inflation in large countries is

set for only a slow decline now as inflationary expectations have become firmly established, and food prices are likely to rise strongly.

The latest batch of brokers' circulars is cautious about the immediate prospects for the gilt-edged market and for interest rates.

Brokers Capel-Cure Myers estimate, for example, that further switching of banks' operations back within measured monetary aggregates as a result of the end of the current controls may add between 3 and 8 per cent to sterling M3, the broadly defined money supply. The outcome may be nearer the lower end of the range.

Capel-Cure argue that interest rates are likely to stay higher

for longer than most observers thought likely earlier in the year if monetary targets mean anything. Consequently, there may be only limited scope for any further immediate reductions in Minimum Lending Rate.

Brokers Laing and Cruickshank argue that to reduce the rate of monetary growth to 10 per cent a year from October will require an aggressive funding policy with net sales of gilt-edged stock of over £600m a month.

The firm argues that interest rates cannot be reduced more rapidly than the inflation rate, against a background of buoyant corporate lending, an over-shoot on public sector borrowing, and a considerable exposure to interest-sensitive overseas funds held in sterling.

Agriculture threatened by flower pests

By David Churchill, Consumer Affairs Correspondent

A NEW threat to British agriculture and horticulture is posed by seemingly harmless flowers such as chrysanthemums and gladioli.

The Ministry of Agriculture has issued a new warning to returning British holiday-makers not to return with plants from abroad, especially plants from outside Europe. "Such apparently innocent mementoes," the Ministry says, "could pose a threat to British agriculture and horticulture."

The Ministry warns that even apparently healthy plants and vegetables can carry dangerous pests, and diseases which "could thrive in our conditions and ravage our crops and flora."

It said many foreign pests and diseases can prove more destructive in Britain than in their native countries, where natural predators hold them in check.

"Once introduced to this country," the Ministry said, "these pests and diseases can multiply with dramatic success." Colorado beetle and Dutch Elm disease, for example, were both introduced from North America. They decimated many crops and destroyed numerous trees.

The Ministry is supporting its campaign with extensive poster advertising and distribution of leaflets. But penalties for illegally importing such plants include £100 for the first offence, rising to £200 for subsequent breaches.

No official figures are available to show the prevalence of gladioli smuggling into Britain. Customs officials usually destroy the plants on the spot rather than prosecute.

All plants from outside Europe and the Mediterranean area are banned. But from Europe and the Mediterranean holiday-makers can import two kilograms of bulbs, five plants (except chrysanthemum, apple, cherry, pear or plum plants), a small bunch of cut flowers (except gladioli from Malta), and two kilograms of plant produce.

Windmill generator ordered for Orkney

By Ray Permen, Scottish Correspondent

CONSUMERS in Orkney are likely to be Britain's first to receive electricity from power generated by windmill.

An installation could be operating there by Christmas. The North of Scotland Hydro-Electric Board has ordered a 22kW machine from Northern Engineering Industries and will site it at a farm at St. Margaret's Hope, Orkney, as an experiment.

If this tiny generator proves cheap, easy and safe enough to run, the board will install a 250 kW generator within the next two years and move to 1,000 kW machines by the mid-1980s.

A number of electricity boards are planning experimental aerogenerators and there is a private installation in Yorkshire which supplies power to the local grid. The Department of Energy also has a wind energy development programme.

But the hydro board is pressing ahead quickly because it believes wind power will be particularly suitable for the Scottish Islands.

Not only are they reckoned to be the windiest places in Europe, but they are supplied at the moment by diesel generators which are extremely expensive to operate.

To try to recoup some of the extra cost of diesel electricity the board has imposed an 11 per cent surcharge on island consumers, but this has provoked intense resentment.

The local authorities in the three main island groups, Orkney, Shetland and the Western Isles, are raising a court action to have the surcharge declared illegal.

Wind generation would never be sufficient to supply diesel as the main source of power—even in Orkney the wind does stop blowing sometimes—but it could substantially reduce generation costs. A problem now facing the hydro board is that there are no generators in commercial production which are large enough to be operated economically. It hopes to work closely with British companies, encouraging them to develop their own machines or to manufacture under licence from abroad.

Prestel claim upsets Canada

BY JASON CRISP

A DISPUTE has broken out between the Canadian Minister of Communications and the British Post Office over claims being made for each country's rival videodata system.

Viewdata—known as Prestel in this country and as Telidon in Canada—is the system which connects a television set via the telephone to a computer which can give the user access to considerable wide-ranging information.

In June the Post Office claimed that the international standard setting body (CCITT) had recognised only the two fiercely-rival UK and French systems. Mr. Francis Fox, the

Canadian Minister, has published a letter he wrote to Mr. Peter Bontoe, managing director of British Telecom, maintaining that all three systems had been recognised.

Mr. Bontoe, who is believed to be upset at the publication of the letter, is considering his reply, but the Post Office said the corporation stood by its original statement.

Although the existing market for Viewdata is small it is believed to have enormous potential over the next few years and the rivalry between the different systems is exceptionally fierce. The key area is the U.S., where the French

have been marketing very strongly although their system, Teletel, is not yet available. There are about 5,000 Prestel users in the UK.

Mr. Fox's letter states: "We in Canada believe you must have been ill-informed as to the events which took place in the meetings in Montreal leading to the initial agreement. For the most part our past relations have been characterised by co-operation rather than friction."

It says the preference for one system or another will be determined in the market place and it is confident Telidon will come out ahead.

Youth unemployment 'growing steadily'

BY LISA WOOD

UNEMPLOYMENT among young people is tending to increase over the years, regardless of cyclical peaks and troughs in the economy, according to a report published recently.

A particularly disturbing feature of this trend, says Youthaid, a research body which lobbies on behalf of the jobless, is the growing hardship of young, long-term unemployed.

Youthaid says the number of

unemployed aged below 19 was more than five times greater in July, 1979, than in July, 1973, compared with a two-fold increase during the same period for unemployed over 19.

The Manpower Service Commission estimated in November, 1978, that total unemployment would increase by 30 per cent in 1982, says the Youthaid report, but that school-leaver unemployment would increase by 125 per cent.

Youthaid recommends that, given the long term decline in demand for young workers, the Youth Opportunities Programme must be retained and its quality improved. Training and education opportunities must be extended for those 300,000 school-leavers who each year enter jobs where no further training or education is provided because new technology is eliminating these unskilled jobs.

A flutter available in 57 varieties

THE DAY I reached Andover to visit Bob Kitchener, manager of one of the William Hill betting shops in the town, the money supply figures came out, showing an enormous leap in whatever M3 is and causing consternation throughout the markets.

The FT index dropped 7.8 and gilts were said to be off sharply. Seeing the punters come in to place their yankees, super-yankees, patents and goliaths I wondered if there was any connection between the two. Certainly none the punters would recognise. But then corporate treasurers dealing in Euro-deposits almost certainly think a yankee is either a baseball player or someone born north of the Mason Dixon.

My betting tends to be confined to an occasional flutter on the Derby and the Grand National and my appreciation of horses is strictly limited. So it surprised me to discover that most betting now is done in multiples.

Bob Kitchener explained to me that a yankee is four selections split into doubles, trebles and an accumulator. A super-yankee is the same, only with five selections, and a patent is three singles, three doubles and three trebles. Heaven knows what a goliath is but if you really want a big one there's a Heinz, which as its name suggests is 57 bets combined in some permutation which eluded me. There is also a jackpot and an ITV jackpot seven.

Andover is an average sort of town as far as betting is concerned, not rich, not poor; there

is some short-time working and nearby courses such as Salisbury and Newbury to whet the appetite of the racing as opposed to the betting fraternity.

"The state of the economy doesn't seem to affect things," Mr. Kitchener says. "People always seem to have a bet."



By Anthony Moreton

sometimes wonder where they get the money from. If they are out of work it's as though they are hoping to hit the jackpot and end all their problems. It's either us or bingo. Sometimes they go from one to the other.

"Most of the customers in the shop are really small gamblers. They probably put 50p on a race, a couple of quid an afternoon. A yankee might cost them £1.10 or a patent 70p." He talks of his "customers" and his "shop." He could be selling sweets or cabbages. "But I do have some big gamblers. Several farmers and

publicans think £20 is a very small stake. We get £100 and even more and we take it without flinching. I did one chap yesterday with two bets of £100, one of £60 and a couple of £40. He was chasing his losses."

It is no coincidence that Bob Kitchener remembers these bets. At the first sign of a big bet he and his staff go to red alert. He has to weigh up the chances of a coup being staged or whether the punter is going to take a lot of the ready stuff home with him.

Bets over a certain level have to be referred to head office in London and he is constantly on the phone during the afternoon, telling them of heavy bets or winning ones.

Mr. Kitchener also has to keep a strict legal watch. "The law is very tight about shops. We must not have the door open, we can't have television and in general we can't make the shops comfortable."

He agrees with me that the British are hypocritical about betting. Parliament has allowed betting but has done its best to make it a rather squalid business by hedging its operations with so many petty rules and regulations. "They have attempted to make us dens of iniquity, which is the very reverse of the truth."

He thinks that sort of mud has stuck, however, among one section of the community. "Lots of women come in here but it's mostly a male world. Women tend to think they will be considered 'loose' if they come in, rather as they once were if they

went into a pub, or even if they go into a pub on their own today."

Some of the men don't make it easy for the women. "We tend to get blokes who have their own pitches and they don't like anyone standing there if that's their spot. They won't go in for any aggression but they'll bump into you as you are filling out a form or nudging your arm. Little things like that."

Since the law allowed them to operate, betting shops have altered very little. There are video screens instead of the blackboards detailing all the runners and winners, and one or two places—especially in central London—where there are really rich clients, such as the Arabs, take a chance and put in easy chairs. But most offer only a couple of stools.

Nor has the betting altered. It's still basically the "seesaws." There is some football, especially for big occasions such as the Cup Final, a little cricket and golf. There was a flutter on Dallas and who shot J.R. and at election times there will be some political betting, though Bob Kitchener doesn't see any of it. That is invariably placed nationally.

His trade comes from the race cards and the Sporting Life is his bible. "I get all sorts. A lot of them are compulsive gamblers. I've seen some blokes look desperate at the end of the day. They must have done their wages in. It's no wonder only bookies ride in Rolls. Tomorrow: Apprentices in Arborfield."

Food producers shine in rising farm exports

BY RICHARD MOONEY

BRITISH EXPORTS of agricultural produce and supplies are still growing, according to figures published by the British Agricultural Export Council. In the first half of this year they were worth £1,150m compared with £2,060m for the whole of 1979. The council did not compile figures for the first half of last year.

If the first half performance were repeated in the second six months of 1980 the growth in value would be somewhat below the inflation rate, but British exports, particularly of produce, generally do significantly better in the second half.

Produce exports, which fell last year, showed healthy signs of recovery, the council said, with butter and unskimmed milk doing particularly well. In other sectors seed potatoes and agro-chemicals put in good performance. But exports by the animal feed industry were hit by the high level of the pound.

Out of the first half total exports of livestock accounted for £547m, produce £482m, seeds, feed, fertilisers and agro-chemicals £179.2m, tractors, engines and field machinery £340.5m and fixed equipment, processing machinery and miscellaneous items £97.4m.

The total excluded veterinary medicines and consultancy and management services. Of the produce total of £482m, the total for meat was £121.8m, dairy products £144.7m, eggs and egg products £3.5m, unskimmed milk £125.7m, fruit, vegetables and flowers £22.6m, wool, hides and skins £57.7m and honey £700,000.

Food Export Council announced that first half food exports were 22 per cent higher at £983.7m compared with the same period last year. But it noted that the performance had slackened in the second quarter when the total was £467m against £416m in the first quarter.

Marks and Spencer backs origin labelling

BY DAVID CHURCHILL

MARKS AND SPENCER, the country's largest clothing retailer, has backed Government plans to introduce compulsory origin marking of a wide range of consumer goods.

Marks' position has been made clear in a letter to Mrs. Sally Oppenheim, Minister for Consumer Affairs, and is at odds with the official position of the Retail Consortium, the main trade organisation for the retail sector.

The consortium describes the new country-of-origin marking proposals as "invidious" and suggests there is little support for the move.

But Marks says in its letter that "in our experience, an increasing number of customers want to know where goods have been made, no doubt in view of the growing unemployment, and

as an indication of quality." The Government's proposals for origin marking were announced by Mrs. Oppenheim earlier this year.

Marks' support for the Government's move is made easier because over 90 per cent of the clothing, household textiles and footwear sold by the company is UK-made.

But Marks points out it also exports to other companies in 38 countries. "To do this, our suppliers—who make up our behalf—have to comply with the many different labelling requirements of those countries; in addition to labelling for our home trade."

"This is feasible and practicable and we see no reason why similar arrangements could not apply for other retailers and importers," says Marks.

OFT completes inquiry on electricity boards

BY OUR CONSUMER AFFAIRS CORRESPONDENT

THE OFFICE of Fair Trading has completed its preliminary investigations into the retailing activities of electricity board showrooms following allegations that the showrooms were being unfairly subsidised by electricity charges.

But no decision is likely for at least two months on whether a formal inquiry will be made under the new Competition Act.

The OFT's preliminary inquiries have included extensive

interviews with independent electrical retailers and a number of electricity boards.

Independent retailers have claimed that they are at an unfair disadvantage because the operation of the electricity board showrooms is subsidised by electricity charges.

The independent retailers believe their case has been strengthened by the recent Monopolies and Mergers Commission report which strongly criticised the retailing practices of gas showrooms.

INSURANCE

Help for research into safety training

BY OUR INSURANCE CORRESPONDENT

IN THEIR daily task of providing protection against risk for premium, insurers are sometimes accused of adjusting rate to take account of adverse experience without taking positive steps to see that adverse experience is improved.

Upward rate adjustment is an indirect way of bringing pressure on the policyholder to put his house in order, just as is the imposition of restrictions, excesses and so on, which oblige the policyholder to share in the cost of the claims he puts to insurers.

More directly, positive encouragement is given, for example, on the property side, by way of discounts from book rates for the installation of fire prevention equipment, while the range and quality of anti-theft devices the policyholder employs have a definite bearing on the price he pays for cover.

Motor fleet operators are encouraged by insurers to give their employees safe driving centres—to reduce claims costs and subsequent insurance premiums. Motor engineers are sent to advise on maintenance.

Major employers' liability insurers are very concerned to see that accident incidence is reduced—they have experts who will help in analysing causes of industrial injury, and make recommendations for improved safety.

In short much can be, and is done to reduce risk, but insurers still cannot win the insurers' profit on the human suffering that still occurs and should therefore make some contribution from their profits to non-insurance research to reduce that suffering, either by prevention, or where possible, quicker cure.

spend in this way. This summer, for example, insurers have set aside some £350,000—perhaps no great sum in modern pounds, but still substantial in a year of adverse UK underwriting results—for safety training and rehabilitation studies.

Through the British Insurance Association, insurers are contributing £100,000 to the Royal Society for the Prevention of Accidents, which is developing its Occupational Training Centre at Birmingham—by increasing the number and scope of safety courses it offers.

The Centre has been open for 20 years or so, and last year some 5,000 people participated in 130 courses aimed at reducing the human and financial costs of industrial accidents. Now more lecture and conference rooms are needed and the insurers' money will be spent on their construction.

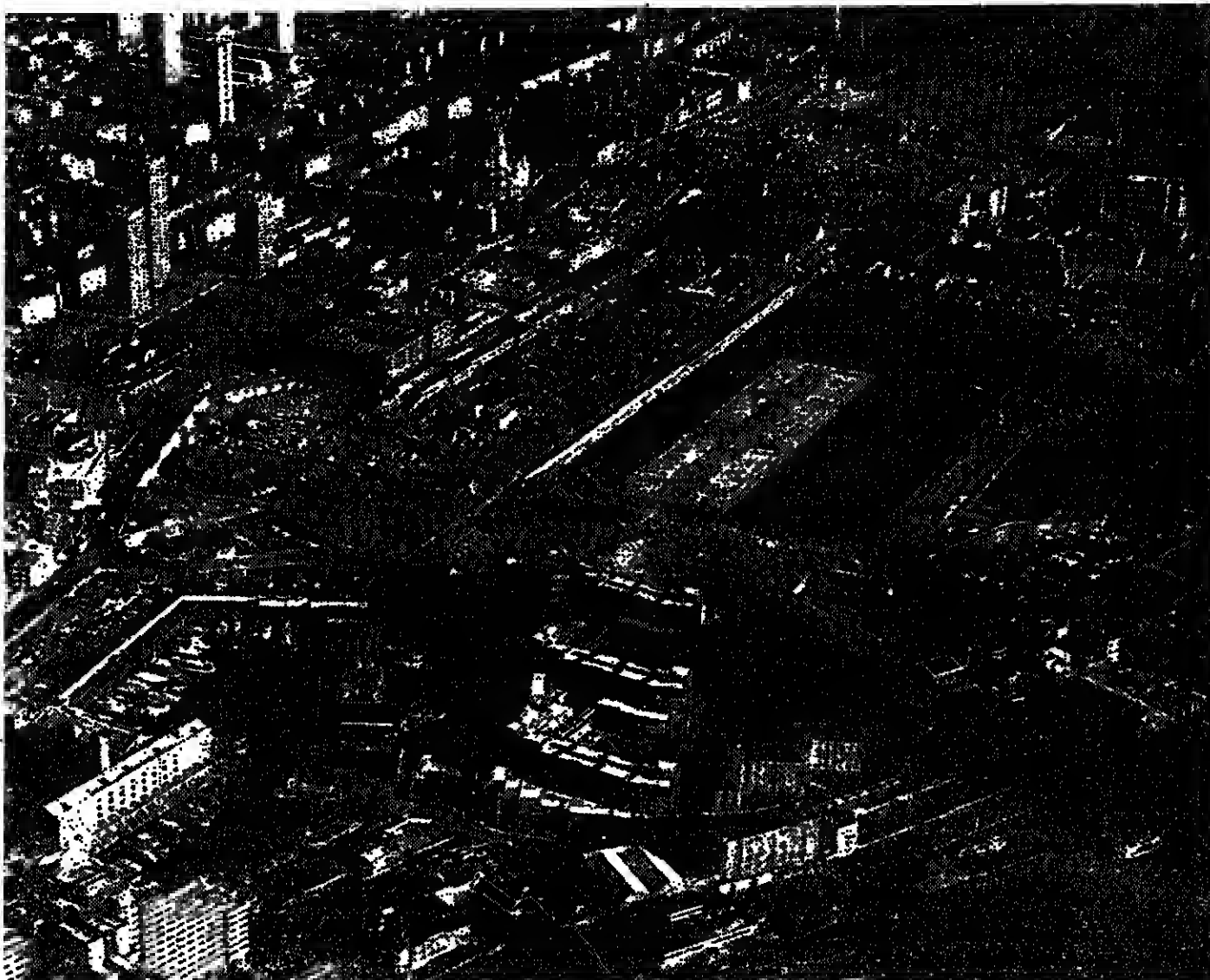
Through the Accident Offices Association, insurers have given the Rehabilitation Studies Unit of the University of Edinburgh a grant of £264,000. This money is to enable the unit to expand its research into rehabilitating victims of hand injuries, fractures and amputations, the unit works with the University Department of Orthopaedic Surgery and the Bio-Engineering Unit, which is one of the major UK centres for the development of artificial limbs.

New academic posts are to be created and one will be further training of orthopaedic surgeons in the management of hand injuries. While hand injuries account for a quarter of all injuries at work, many road accident victims suffer hand injuries, as well. So hand rehabilitation research must be of benefit both to insurers and the premium-paying community.

NUCLEAR SHELTER

INAUGURAL ONE-DAY SEMINAR AND EXHIBITION MASS HOME DEFENCE

Building and Civil Engineering



London Docks area, showing St. Katharine Docks in the foreground, the Western Dock in the centre and the Shadwell Basin top right.

£9.7m contract to clear London Docks

WORK ON a £9.7m contract for the London Borough of Tower Hamlets for the clearance, demolition, dredging and reclamation of the dock basins of the disused London Docks, Thomas More Street, London E1, has been started by Taylor Woodrow Construction.

Consulting engineers for the project are Ove Arup and Partners, and the chartered quantity surveyors are Burrell, Hayward and Budd.

The contract calls for the removal of silt and unsuitable material from the Western Dock and Shadwell Basin, then the re-filling of the whole of the Western Dock area, to make

way for new housing. Shadwell Basin is to be partly filled and made suitable for use as a water recreation centre.

Building demolition material from the London area is being processed on site by large crushing machines and will be used as fill.

Jetties, storage vaults and

similar structures which form part of the original dock facilities will be demolished. Additional work will include the upgrading of neighbouring roads and construction of a new link road, construction of new drainage systems, including an outlet into the River Thames. Work is due for completion in early 1984.

Over £10m worth to Laing Offices and workshops

TWO CONTRACTS just awarded to John Laing Construction are together worth £10.1m.

Larger project is to be built at Gravesend, Kent, for CIN Properties (Coal Board Pension Fund) and is worth £9m. To be known as the St. George's Centre, this will be built on the site of a former car park at Bath Street, Gravesend, Kent, and the precinct will have a gross floor area of almost 400,000 square feet.

British Home Stores and Marks and Spencer, both

presently trading next to the site, will have extensions to provide new shopfronts on to pedestrian malls. New stores are to be built for J. Sainsbury, Mothercare, Boots the Chemist and W. H. Smith, and more than 30 smaller shop units are to be constructed.

Contracts for an industrial extension and office accommodation are worth more than £1.3m and are respectively for Tetra Pak at Wrexham, North Wales and the National Union of Public Employees at Ashton-under-Lyne, Lancashire.

Pipelaying by Biggs Wall

TOTAL AMOUNT of work recently awarded to Biggs Wall and Co., is worth just over £5m and includes a pipeline construction, gas mains and service laying contracts valued at about £3.2m.

Work in this category covers two contracts for steel pipelines at Greenwich in south-east London and one at Ockham, Surrey for South Eastern Gas; a scheme for North Thames Gas at Beckton, east London for

extensions to the refinery main, a mains and service laying two year period contract for the South Anglia area for Eastern Gas, and an above-ground installation for Southern Gas at Princes Risborough, Bucks.

British Pipeline Agency has also awarded a contract for the relaying and realignment of 17.5 km of 250 mm welded steel pipelines, valued at about £1m, to be carried out in the Stoke Gifford, Castle Combe and Chippenham, Wilts. districts.

Contracts for Lelliott

RESTORATION AND refurbishment of a Grade II listed building (8 Clifford Street, London W1) is included in contracts worth about £2.6m just announced by John Lelliott.

Built in 1719, the building is to be restored for use as offices under a contract worth £850,000 from Trust Securities Holdings. The front will be restored and refurbished in the historic character of the original and old wood panelling and artwork on walls and ceilings will be

protected during alterations, and later fully restored.

The company will start next month on the construction of a six-storey office at City Road, London EC1 under a contract valued at about £1.5m.

Work has started on demolition, alteration and extension to offices at Portsmouth Road, Thames Ditton, Surrey which, when completed in the spring of next year, will provide office and showroom accommodation for a new BMW dealership.

New jobs in north-east

A TRANSPORT DEPOT for Hartlepool Borough Council

with a contract value of £838,000 heads a list of new jobs just won in the north-east of England by Rush and Tompkins. This covers construction of a main bus garage with waiting bay and ancillary rooms including all finishes, services and fittings.

Under way in Ridley Place, Newcastle upon Tyne for New England Estates is an £835,000 town centre project comprising an office block with basement,

ground floor and four upper floors.

Three other projects are all for technical users and include a £275,000 technical support building at Washington, Co. Durham for Phillips Electronics; a £308,000 operational depot for Northern Gas at Blythe, Northumberland; and work is already in progress on an extension and alterations to existing laboratories at Stockton on Tees for Davy McKee (Oils and Chemicals).

IN BRIEF

● Duke and Ockenden (Mowlem Group) has won almost £400,000 for three orders for drilling rigs in the Middle East and Far East.

● J. Y. Lovell (Building) is to fit out a new Guildford bus station under a £108,000 contract from Thames Valley and Aldershot Omnibus Company.

● A £13m contract has been awarded to Marryat Jackson Norvis for mechanical building services work on the new North East Thames Health Authority.

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Cannery and warehouse

MEMBER OF the William Moss Group, William Moss (Construction) has announced the award of a major contract, valued at £4.1m, by Bachelors Foods, part of the Unilever Group.

This involves erection of a new cannery and warehouse at Worksop, Notts., and work is expected to take about 18 months with completion scheduled for spring 1982.

Several awards to Millard

ABOUT £1.4m worth of contracts have been won by Millard Contractors.

The largest, valued at £694,509, is for a vehicle maintenance depot for Dudley Metropolitan Borough Council.

Other awards are for a car showroom at West Bromwich for Charles Clark (Dartmouth) valued at £133,991, for dwellings at Dudley for Jobson Housing Association (£269,594) and for factory alterations (£120,000).

Technical News

EDITED BY ARTHUR BENNETT AND ALAN CANE

DATA PROCESSING

Investment portfolio management

COMPUTER MANAGEMENT GROUP (CMG), the Provincial Insurance Company and Computer Automation last week launched a new investment portfolio management system.

The new system, known as Invest 3, is thought to be of most interest to those looking after pension fund management in large companies, public utilities, unions and local authorities — in other words any portfolio with investments totalling over £10m.

CMG claims that it is the first system of its kind based on a minicomputer. It will be marketed by CMG City, which already markets the mainframe based system Invest which has been used for over 10 years by major insurance companies handling over £15m of stock exchange investments.

CMG is one of the UK's major bureaux with particular interests in business computing using a wide range of hardware. Its chief bureau operation is based in Burroughs mainframes. Last year the CMG

group turned over about £15m which makes it one of the top five services companies in the UK and one of the top 12 in Europe.

Computer Automation is the UK subsidiary of the American minicomputer company; its Commercial Systems Division markets the SyFA minicomputer systems which are the basis of the Invest 3 development.

The Provincial Insurance Company developed its own interactive portfolio management system on a SyFA computer using a development of CMG's Invest 2 hatch bureau system, and it is this system which will be marketed as Invest 3.

The package will run on a basic SyFA Junior with 64K bytes of memory, 32 megabytes of disc storage and two visual display units. There is also a 180 character a second printer.

The package can be installed for under £50,000. CMG is taking the lead in marketing the new system and can be contacted on 01-681 7631.

New plant in Scotland

A NEW floppy disc drive and a new cassette drive will be among the first products from a manufacturing venture in Scotland by an American peripheral specialist.

The UK subsidiary of MFE intends to build a new manufacturing plant in Livingston which could give rise to 200 new jobs within 18 months.

The new drives, the MFE 700 double-density, double sided floppy disc drive and the 450C cassette drive have been designed specially for the European market. The disc drive is

plug compatible with Shogart drives. The cassette drive will take Philips data cassettes.

According to Mr. William Lahti, managing director for MFE Europe, the new plant marks the beginning of a push for more business in Europe.

MFE's kit is at present manufactured at Salem near Boston, Massachusetts and in Puerto Rico. Mr. Lahti said: "With a European customer base giving us \$5m worth of business by the end of this year, it is no longer feasible to satisfy demand from plants in the U.S. and Puerto Rico." MFE is on 0589 410242.

TIMBER

Gets more out of the sawmill

A COMBINATION of laser and microcomputer technology has been used to increase the yield from British sawmills.

A new cutting system called LOCAS (Laser Optimiser and Cant Alignment System) has been developed by the Princes Risborough Laboratory of the Building Research Establishment which looks as if it might generate new income of up to £100,000 a year for medium sized saw mills — that is mills dealing with up to 20,000 cubic metres of softwood a year.

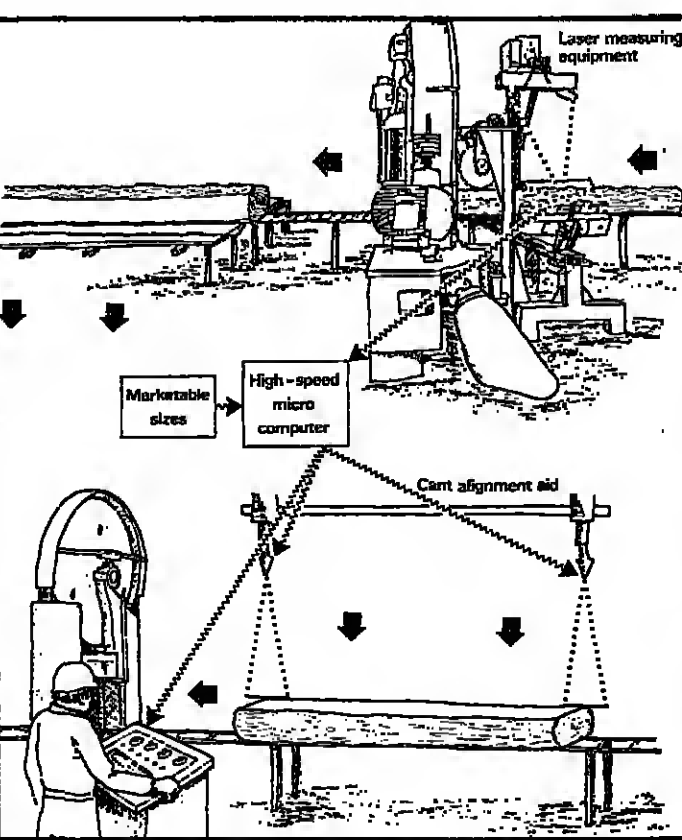
The UK imports most of its softwood but an increasingly important proportion — now up to 10 per cent — comes from British forests. Compared with timber from North America or Scandinavia, British timber is irregular in cross section and somewhat bowed and twisted.

In consequence, although there has been a lot of activity directed towards developing computer aids for more effective timber sawing, they are generally more applicable to American and Scandinavian wood.

Laser beams

Keith Mann and Nigel Smithies of the Princes Risborough Laboratory have developed a system which depends on medium power laser beams to determine accurately the shape and cross section of a log to be sawn and high speed computing techniques to tell the operator the best way of sawing it.

The constraints Mr. Mann and Mr. Smithies worked under were set by the proprietors of the saw mills themselves — and the timber business is one of the least technology conscious in Britain. They system had to be installed without major



alteration to the mill itself. To repay its capital cost inside two years and to have little or no effect on the throughput of timber.

What they did was to develop a system of three laser beams which analyses and builds a model of the cross section of the log as it enters the mill.

The lasers were supplied by Plessey, as was the high speed microcomputer which processed the results of the laser scan. Built to Ministry of Defence standards, the Miproc microprocessor Plessey supplied was the only 16 bit micro which could do the job when the prototype was being constructed, according to Mr. Mann.

The log is then sawn using a double slabber saw provided by Steiner of Tiverton in Devon and the resulting parallel sided log is ready for final cutting. The operator knows from the computer analysis how best to

cut the log; laser beams are again used in the cant alignment aid to set the log in the best position for sawing.

There is some controversy over the use of laser beams in the saw mill — the safety aspect is being investigated by the Government's Harwell laboratories. Mr. Mann points out, however, that the beams scan the log extremely rapidly and when not in use they are jacketed giving maximum safety.

Princes Risborough will be demonstrating the system in use at the saw mill of John Gordon and Son on November 6 and 7. Those interested should contact Miss Diane Poole on Princes Risborough (084 44 3101).

The laboratory is looking for manufacturers who might make the LOCAS machinery under licence. There has already been some interest from abroad.

TEXTILES

Makes strong and even thread

CANADIAN TEXTILE specialists have developed spinning machines that are now being used in this country to produce an even and very strong thread.

The new yarn is being produced by a comparatively new company called Remora Textiles of Leicester (0533 885746).

The process is called the Bobtex method of spinning. What happens is that the molten polymer forming the basis of the yarn is extruded through a jet and wrapped round with a sheath of conventional fibres before it has time to set.

Bobtex yarn has the appearance of conventional yarn, but can be produced at relatively low cost and high speed.

And although one might think that the method of manufacture would produce a yarn of unusual bulk and stiffness, Remora claims its newest yarns are ultra soft.

Knitting manufacturers will be interested in the production detail that the yarn is produced in large knotless packages. As knots may well damage needles or other knitting elements, it is

clear that machines using Bobtex yarn can be run at higher speeds and efficiency.

Chief interest in the new yarn is in 5 and 10 gauge single jersey and in inlay fabrics while flat knitters with 5, 7 and 10 gauge machines should be able to use the yarns for cut-and-sewn garments. Remora believes the yarn may be ideal for the half-hose trade.

Remora invested about £1m in the Canadian technology, he believed to be the first of its kind in Europe.

INSTRUMENTS

Passes the acid test

HORIBA INSTRUMENTS of Northampton have introduced a new range of bench top pH meters to complement the company's range of smaller portable pH meters recently announced.

There are two standard versions, the M7 and the MFE which are claimed to be accurate to plus or minus 0.03 of a pH unit. As an added bonus, they will measure voltages in the range 0 to plus or minus 1400mV. There is provision for recorder output and the meters will operate off AC line voltages or DC internal batteries.

There is a more accurate series, the F7, FTLC and the FTAD which are claimed to operate to plus or minus 0.005 of a pH unit, and at the top of the line there is the supersensitive F7SS which is capable of resolving plus or minus 0.005 of a pH unit.

Horiba claims the meters are virtually maintenance free: the FTLC incorporates a digital readout, while the FTAD affords both analogue and digital display.

The meters are complemented by a single pH electrode which combines in one unit a measurement electrode, a reference electrode and a temperature compensator.

Horiba will provide more details on 0604 65171.

Easier to read pressure

A MANOMETER which indicates pressure on a dial rather than as a liquid level in a glass tube has been introduced by Actuators Controls of Bristol.

Its L3DK Dial Indicating Manometer was designed in Bristol and is manufactured at its Hartcliffe Way factory.

The unit has a 3 in. diameter scale, and can be provided in the following ranges in inches of water: 0.2, 0.5, 0.10, 0.20, 0.40 and 0.100. The accuracy is claimed to be plus or minus 2 per cent of full scale deflection.

Actuators Controls claims that all its models will withstand an overload pressure of 120 in. of water.

The price of the manometer is £15.00 as a oneoff. There would be discounts for orders in quantity. Details from Actuators Controls on 0272 667581.

IN THE OFFICE

Speeds the flow of mail

IT IS claimed that up to 200 envelopes a minute can be processed by the latest piece of office equipment to be produced by Pitney Bowes, The Pincodes, Elizabeth Way, Harlow, Essex CM19 5BD (0279 26731).

It will handle envelopes ranging from 3½ by 5 in. to 13½ by 13 in., although there is an adaptor which will extend the size up to 13½ by 17 in. Envelope thicknesses can be from 0.007 to 1 in.

The machine is equipped with

CONFERENCES

Design of dams

THE INSTITUTION of Civil Engineers, in association with ENCOLO and SECOLO and sponsored by UNESCO, has organised a conference on the design of dams to resist earthquake.

Over 30 papers are to be presented by authors from the UK, Yugoslavia, Belgium, Switzerland, Italy, Japan, Argentina, U.S.A., Peoples Republic of China, Greece, Portugal, Mexico and India.

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Farrow gets work in London

TWO CONTRACTS with a combined value of £1.3m have been placed with a Lovell construction company, Farrow Construction.

Work has started on the larger of the two projects which comprises the erection of eight warehouse units, each with integral office accommodation in three blocks off Carruth Road, Ealing, London, W5, for Capital and Counties Property Company. Contract value is £900,000.

A single-storey day care centre is to be built at Winkfield Road, Wood Green, London, for physically handicapped adults. When completed it will accommodate catering facilities, occupational therapy units, specialist hobby areas and quiet rooms.

Hangar and workshop

AN aircraft hangar and workshop is to be built at East Midlands Airport, Castle Donington, near Derby by Fairclough Building. The contract is worth £1m.

The hangar, which will be used mainly for the repair and maintenance of Boeing 707 jets, will have a wide-span cantilever roof 17 metres high. The steel frame exterior, clad with metal bonded sheets, will match an adjoining hangar.

A large concrete apron for aircraft access roads and taxi way for service vehicles are also included in the 35-week contract, on which work is now under way.

Cartem (Kent) has won a £175,000 order to build 30 hitumen storage and bagging tanks and associated pipework and equipment for a road construction project being undertaken in Iraq by the Fujita Corporation of Tokyo.

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DREDGING

New service set up

THE J. J. Henry Co. Inc. of Moorestown, New Jersey, and Seadrec of Paisley, Scotland, have formed a joint venture company to provide dredge designs, detail construction drawings, associated engineering services, and dredge equipment to clients throughout the U.S. and Canada.

The new company is called Amalgamated Dredge Engineering and its corporate office will be located in the Moorestown office of J. J. Henry with additional premises within the Seadrec offices at Independence Square in Philadelphia.

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MANAGEMENT

EDITED BY CHRISTOPHER LORENZ

A toy baron tries to get back on the rails

Richard Beecham is picking up some of the pieces of his lost toy empire. Arnold Kransdorff reports

RICHARD BEECHAM, one of British industry's more forceful personalities, is a humbled man. In the old days his opinions, always readily available, would be compulsively optimistic — a characteristic many observers said was a prerequisite for survival in the highly entrepreneurial toy industry.

He has always been ambitious but in trying to extend his empire too quickly, only tripped himself up. He came to grief in the highly competitive U.S. market after trying to integrate two expensively-acquired subsidiaries. The end came because the holding company took on too many commitments and loan guarantees in relation to the size of the UK businesses.

Today, the former boss of Dunbee-Combox-Marx, which crashed last February with debts of more than £15m, reckons he is a wiser man.

"It taught me to recognise my weaknesses," he says. "I now realise that I lacked the skills of a financial controller and I was constantly euphoric."

Armed with this newly acquired wisdom he plans, Phoenix-like, to rise from the ashes and launch himself back into industry, a move which is similarly being planned by DCM's other former managing director, Basil Feldman.

The two men, at whose doors lies the responsibility for DCM's demise, are now separately buying up many of the fallen giant's profitable UK subsidiaries, and will run them as private companies.

Both men are being independently backed by consortiums which include blue-chip names like Industrial and Commercial Finance Corporation (ICFC), County Bank and Electra Investment Trust.

Although both men have chalked up the most spectacular failure in the toy industry since Lines Brothers collapsed in the 1960s, they are among a small band of entrepreneurs with vast experience and contacts in the sector. Beecham, especially, is a highly respected marketing man.

So far Beecham's consortium has bought three DCM subsidiaries: namely Burbank Toys, Combox and Pedigree Dolls and Toys, the latter being the plum of the package.

Burbank makes soft toys and character merchandise such as Mickey Mouse products. Combox also produces soft toys as well as nursery toys and household toys while Pedigree sells the Sindy fashion doll, a UK market leader.

Feldman's consortium is shortly to finalise the purchase of DCM's DIY and industrial division known as Martlet, which made profits of £1.2m in 1979. This part of the business is thought to have cost roughly £5m.

Both deals have been conducted against the background of competitive interest from other parties.

For Beecham, the question of whether he should be buying up parts of the defunct company has once headed is purely academic. "I can debate it at length but from my point of view I have been able to persuade my backers to put money up front. At the end of the day the Receiver is legally bound to accept the best offer for the creditors. In this case I am confident we paid the top dollar, perhaps up to £1m more than the next highest bidder. I see no conflict."

Beecham's backers, like Feldman's, include both individuals and institutions, none of which had any interest in the old DCM.

STATE OF PLAY WITH THE OTHER SUBSIDIARIES OF DCM

UNITED KINGDOM
Rovex, of Ramsgate (Nornby, Scalextric) — still in the hands of the Receiver. Could cost purchaser up to £12m.
Jean Sorelle, of Peterborough (bathroom toiletries) — sold to a company run by Mr. and Mrs. Robin D'Abo and Mr. Robin Gunn, for an undisclosed sum.
Hamman & Morgan, of Watford (control systems) — still in the hands of the Receiver.

Louis Marx and Co., of Swansea (guns, friction toys, Play People) — still in the hands of the Receiver.
Novo Toys and Sino Toys Developments, of Macclesfield, near Peterborough (two companies set up to administer old mould sales to USSR and China) — still in the hands of the Receiver.

OVERSEAS
Lidrana Pty. of Australia — in Receivership.
Schuco Spielwaren, of West Germany and DCM Depreux, of France — in liquidation.

Belgium and Dutch subsidiaries — sold to toy-makers J. W. Spear for an undisclosed sum.
NORTH AMERICAN DIVISION
Aurora activities — sold to a consortium headed by a Canadian bank.

Louis Marx Co. Inc., of Stamford — still under Federal Court jurisdiction. So far \$8.5m stock and equipment has been sold — \$1.5m to Mego Corp. and \$7m to Empire of Carolina Inc. Further \$5.5m machinery and patents expected to be sold shortly to Aurora purchaser. Remaining assets could be worth up to \$10m.

Hong Kong subsidiaries — in liquidation.

Basil Feldman (left) and Richard Beecham in happier days. The two former joint managing directors of Dunbee-Combox-Marx are now going their separate ways in buying up the profitable parts of the failed toy giant. Beecham is especially anxious to get his hands on Rovex, which makes Hornby trains.

per cent of production is sold. This becomes costly when stock sticks.

Against this background Beecham's first management decision has been to transfer Burbank's manufacturing operation at Wellingborough to Pedigree's factory in Canterbury and to Combox's unit at Peterborough. The Wellingborough premises will be used exclusively as a warehouse.

For the future Beecham is surprisingly positive given his recent experiences. In spite of difficult trading conditions he still asserts that he can achieve pre-tax profits of more than £1m at the end of December and £1.75m, on sales of around £20m, for a full year — a profit figure only about £250,000 less than these companies' peak performance in 1978. Pedigree, he says, has confirmed orders of around £15m while Combox should contribute another £5m.

Clearly, Beecham is anxious to show his backers that he can produce the goods, and so strengthen his case when he asks for funds to enable him to expand.

Beecham admits to being as ambitious as ever, and part of this compulsion is an obsessive desire to get control of Rovex, the jewel of the DCM group. At its peak in 1978 the company, which makes the famous Hornby trains and Scalextric model car racing systems was probably earning £1m pre-tax.

But there has been no shortage of interest from potential purchasers for the company DCM acquired from the liquidator of the Lines Brothers group. Among others, Ladbrooke Group, Brent Walker, GEC and General Mills (the U.S. toy company) have all made approaches to the Receiver at DCM, so Beecham is naturally apprehensive that Rovex will be snapped up by someone else.

"I have to walk a tightrope," he says anxiously. "My backers want me to prove myself over time they are going to commit themselves to such a big investment. It is possible that I will be in a position to make an offer in several months' time."

Longer term Beecham — like Feldman — wants to return as a public company and quotes a three-to-five year time span. Feldman is less specific, saying he has "no deadline."

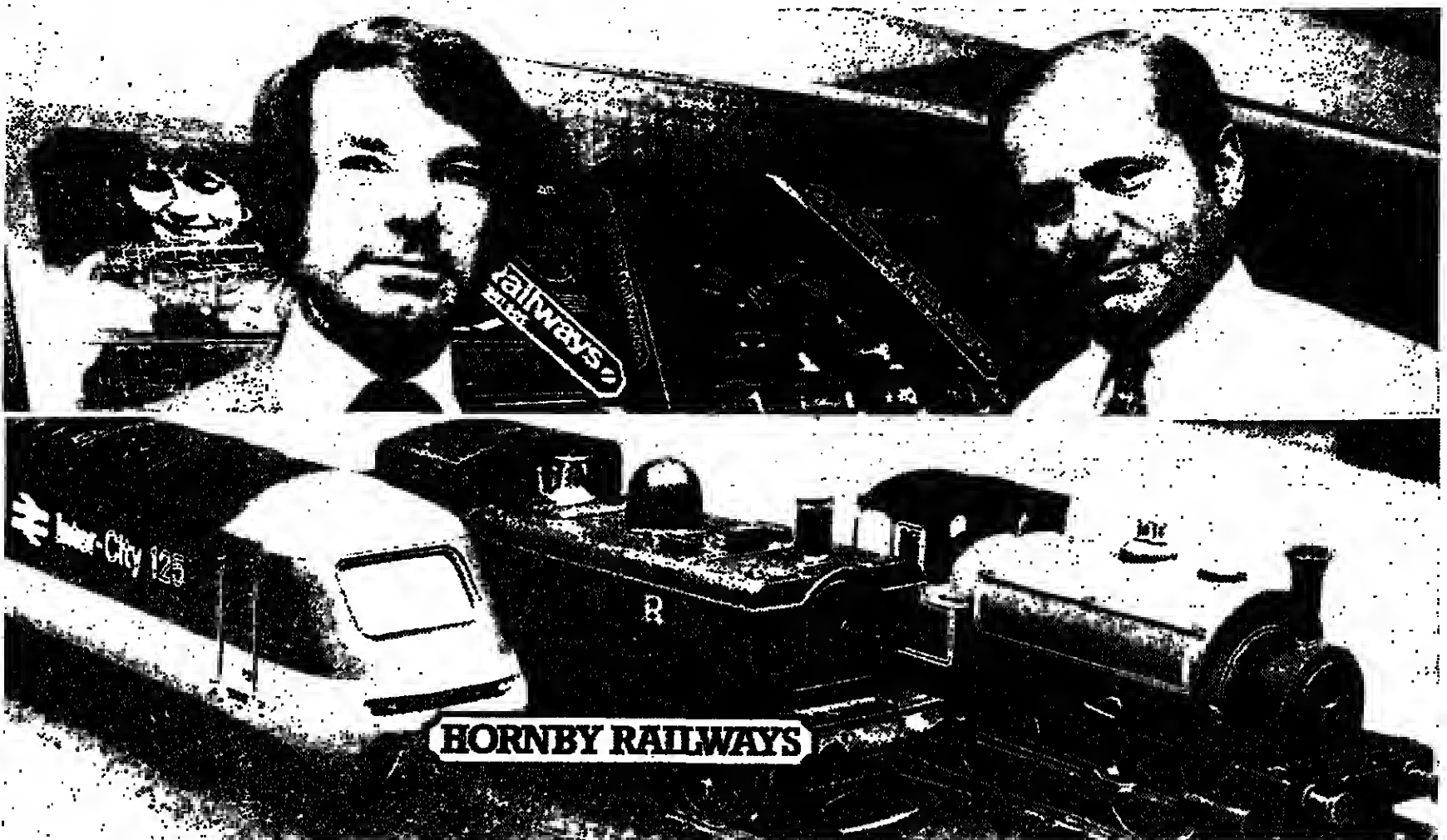
Estranged

The two men, who have worked together for 32 years — Beecham is 55, Feldman 54 — are becoming increasingly estranged over the past few years although their differences have been kept private. "They give a clear impression of relief at not having to work together any more."

Feldman is less forthcoming about his plans but equally positive about the outlook. He points out that as part of DCM, Martlet, whose business includes plant hire, cash-and-carry wholesaling of D-I-Y products and the distribution of vinyl sheeting and plastic products, had never had an independent identity.

His backers include Martlet's management team of Peter Lewis, John Carlton, Steven Pearson-Johnson and George Burnett. ICFC and Electra Investment Trust. Feldman will be chairman with Lewis as chief executive.

Both Beecham and Feldman are clearly very keen to return to the mainstream of business life. Being the enterprising characters they are it is unlikely they will disappear from view but, with both running private companies, they will no doubt retain the low profile they can now keep — at least for a little while.



DKB ECONOMIC REPORT

August 1980: Vol. 9 No. 8

Some signs of concern over dulling of demand in Japan's economy emerge

Business activity in Japan has shown steady growth since its gross national product (GNP) for the January-March period of this year increased by 1.8 per cent over the preceding period of last year — an annual increase of 7.2 per cent.

The surplus in current accounts supported by increased exports and decreased imports in quantity accounted for the 1.8 per cent increase. Domestic demand made no contributions to the GNP growth.

Sluggish growth in private housing investments and suppression on public works combined to choke off the growth in personal consumption, private business plant and equipment and private inventory investments.

The outlook for the nation's economy seems to remain unchanged. However, some signs of apprehension add up to affect future demand trends as (1) consumer prices remain unpredictable, (2) production activities are on the downward trend, (3) personal consumption growth has been offset by price increases and (4) overseas markets are unfavorable for exports.

Wholesale prices of finished goods are on the rise

The important points of price development at present are concerned with the future trend of wholesale prices of the finished products and consumer prices.

After wholesale prices dropped by 0.2 per cent in May from the previous month and 0.1 per cent in June, they went up by 0.5 per cent in early July from late June. Although prices of domestic goods continued to rise, wholesale prices dropped in May and June because prices of exports declined due to a higher appreciation of the Japanese yen while prices of imports dropped due to calmness in the market conditions for raw materials.

The reactionary rise of late July is attributed among other things to the lull in appreciation.

of the Japanese yen, price increase in finished products mostly of consumer goods, and temporary increase in the electricity rates for the summer.

The quotation of market-sensitive commodities showed a softening trend in March and April due to a fall in market prices for raw materials in overseas markets. Reflecting the revaluation of the yen and easing off of supply-demand situation, market prices dropped in May for many commodities, including steel, non-ferrous metals, lumber, oil and chemical products.

Meanwhile, the upturn trend of Tokyo consumer prices has gradually declined as the prices went up by 0.9 per cent in May, 0.1 per cent in June, and 0.2 per cent in July over the previous month, reflecting the price decrease in seasonal commodities.

However, the rising trend of consumer prices continued for the last six months starting this February with an eight per cent rate of increase being maintained against the corresponding month of last year.

It is particularly notable that the composite index, in which seasonal goods are excluded, showed an increase of 8.8 per cent during May and June this year compared with the corresponding months of last year and 8.5 per cent in July, nearing the nine per cent level.

We should not overlook the fact that prices of industrial products are rising as prices went up by 7.1 per cent in March over the corresponding month last year, 7.9 per cent in April and 9.6 per cent in May.

Market prices of commodities are expected to shift to a bearish tone, considering calmness in overseas markets and subdued production activities.

With the crude price hikes likely to be compensated by the yen's revaluation, the wholesale prices are most likely to be pushed up by the rising prices of finished products.

The outlook for the wholesale prices does not warrant optim-

ism in view of the rising trend in prices of finished products in the past. The prices of finished products are also affecting consumer prices, and the overall price developments now face a crucial moment.

Some shifts in production activities

According to a survey on the trend of mining and manufacturing production in May, the industrial production dropped by 1.2 per cent in May over the previous month while the shipments of industrial products were down by 2.8 per cent and the stock of the products increased by 2.9 per cent.

The trend in each industry shows, however, that the outlook for production activities is not necessarily on the growing tone. That is to say, production activities in most of the industries, except for precision instruments, electric machinery and non-electrical machinery industries, declined in May. Particularly notable is that the production in transport equipment industry such as automobile manufacturing declined sharply in May, 6.8 per cent down from the previous month.

The declining trend in production activities stems from (1) the reactionary move of the last-minute production for the Jan-March period just before the power rate hikes, (2) a concern for a future drop in demand for exports to be caused by stagnant overseas business, particularly a sharp decline in U.S. economy, and (3) the declining tone in the commodities market.

The future trend in supply-demand situation is a source of concern. The private housing investment has been sluggish as the number of new home buildings during April and May this year was about 10 per cent less than that of the corresponding period last year. The finance-related demand has also lost strength as the public works are restrained to a large extent.

Although plant and equipment investment by private companies is growing smoothly

at present, the future trends in personal consumption and exports must be carefully watched.

Price increases eat up the consumer demand

According to the GNP statistics, the private final consumer spending for January-March this year showed a steady increase, up 0.7 per cent in real terms over the preceding three-month period (Oct.-Dec. 1979) during which the increase rate was 0.2 per cent.

The consumer-related index then shows that the average outstanding balance of Bank of Japan notes for April-June this year increased by 8.8 per cent over the corresponding period of last year. But this is less than a 9.8 per cent increase shown during the preceding January-March period of this year.

The sales of large-scale retail stores were up 9.0 per cent in April and 10.7 per cent in May over the corresponding months of last year. And yet, the sales growth rates still lower compared with the 12.8 per cent increase shown in the Jan.-March period over the corresponding period of last year.

Consumer spending of total households, according to a family income and expenditure survey, went up by 6.8 per cent nominally in April over the corresponding month of last year. In real terms, however, consumer spending dropped by 1.5 per cent for the first time since August, 1978.

Consumer price hikes (up 8 per cent over the previous year) have been gradually holding down the growth of household consumer demand.

The sales of durable consumer goods, such as household furniture and automobiles, which had shown a steady increase, have begun to fall below the level of the previous year, reflecting a sharp decline in personal consumption.

Possible worsening situation in overseas market for Japanese exports

Exports, which play a major role in leading the nation's economy, have been doing well so far. Customs cleared exports on the basis of dollars went up by 26.8 per cent in April, 27.2 per cent in May and 26.9 per cent in June, compared with the corresponding month of last

year respectively. On the basis of volume, the exports increased by 26.2 per cent in April, 19.7 per cent in May, and 16.9 per cent in June over a year ago.

However, overseas markets are rapidly becoming unfavorable for Japanese exports in view of (1) the recent U.S. business recession and apprehension for a worldwide stagnant business condition, (2) various trade frictions between Japan and the U.S. or European countries and (3) higher yen quotations.

Export letters of credit received based on dollars, a leading indicator of exports, increased by only 6.4 per cent in June over a year ago, which is a sharp decline from the 19.4 per cent increase of April and 18.3 per cent of May.

Cautious steps must be taken in carrying out economic policies


As has been shown, price increases held down the demand for personal consumption and the demand for exports faces increasing uncertainty in the future. The basic trend of monetary stringency must be maintained so that the final demand, including personal consumption will be kept firm.

Organization for Economic Cooperation and Development (OECD) predicts that the real economic growth rate of the 24 member countries will be at an annual rate of minus one per cent (-1 per cent) for the latter half of 1980. Such an apprehension for worldwide stagnant business conditions may adversely affect the business sentiment of private companies since production and equipment investment activities are largely supported by export-related industries.

The outlook for the plant and equipment investment by business companies cannot remain optimistic in the future. With price conditions at present facing a crucial moment, there should never be major changes in government economic policies which focus on curbing prices. As the stagnant world's business conditions become still worsened, Japan may face dull demand in future.

In this sense, the new government will have to make a severe choice in its policy maneuvers while trying to rehabilitate the nation's financial situation.

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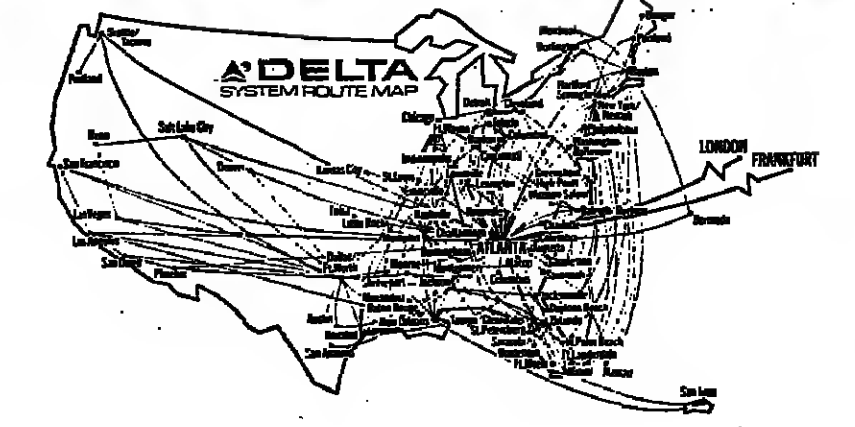
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LOMBARD

The Government's 'creatures'

BY SAMUEL BRITTAN

THERE IS one group of people struggling to be free who deserve limited sympathy. I refer to the chairmen of the nationalised industries, who have become a very effective pressure group and have drummed up an astonishing amount of journalistic sympathy for their campaign to free themselves from Government restrictions.

The whole campaign suffers from a philosophical confusion. If full commercial freedom is the best way to operate an industry, there is no case for nationalising it at all. Industries were nationalised because of a belief that for one reason or another normal profit-making criteria were not applicable and state intervention was required. This belief may have been right or wrong. But it is paradoxical in the extreme, first to nationalise them, and then for their state-appointed managers to ask for the full freedom of operation of a private enterprise. A donkey does not become a zebra if stripes are painted on its back.

Nor is it an answer to say that some state industries remain nationalised merely because they could not find a buyer at a "reasonable price." This means that private enterprise would see little profit in operating some concern at anything like its present capacity, but that it is still supposed to be in the national interest to keep it going.

A normal private enterprise cannot do what it likes because it has to survive in a competitive market. Government managers are checked by the need to face the electorate. Why then should state industry chiefs regard themselves as feudal barons checked neither by the market nor by the political process? For it is impossible to claim that they are regulated by the market when the state guarantees their debts and in many cases confers monopoly power or subsidises their losses.

The immediate grumble is that the borrowing of nationalised industries is governed by an "external financing limit" akin to the cash limits for other government departments. Indeed, in new coal mines or cross-channel ferries, it is said, resembles private enterprise investment more than it resembles

Danger area

Of course improvements are possible. But they must be argued on their merits and not by appealing to the Government's supposed principle of non-intervention, which can have no application in this sector.

The present danger area is wages rather than investment. Some state concerns can pay higher wages by raising, monolithically, their charges to the consumer. It may or may not be a lesser evil to do this to escape industrial stoppages. But the decision is a political one to be made by Ministers and not by Sir Derek Ezra or Sir Peter Parker.

Of course, a great deal of government intervention in these industries—such as holding down prices to massage the cost of living index—has been perverse in the extreme. But the fault was one of economic policy and not the sin of intervention. Critics once said that the Bank of England was "my creature." Sir Keith Joseph and his colleagues should say this of the other nationalised industries and mean it too.

A CURIOUS thing about sherry is that while entirely dry when made, the great majority is sweet when drunk. At first sight this looks like another of those wine scandals so popular with the public. In fact, traditionally, sherry as consumed throughout the world, and not least in Britain, has always overwhelmingly been sweet: that is sweetened.

In the 18th and 19th centuries the fashionable sherry was East India, implying that it had travelled and matured in the bottoms of ships trading between Britain and India. Like its rival, Madeira, it was sweet. So was Golden and Pale Golden that formed the bulk of the 5,000 dozen in the Royal cellars sold off by Edward VII on his accession in 1901. And Old Brandy was at least until World War II indeed it is still available, but now such wines are for the most part creamed, the original of which was created in Bristol more than 100 years ago.

The negative reason for the sweetness of most sherry is probably that in Britain, always its largest market, it was not thought of as an aperitif or pre-prandial drink until comparatively recently, but as a between-meals drink, like Madeira. For up to 1914 there was no pre-prandial drinking, although the "hostesses" might proffer a coupe of champagne to break the crust of the

mauvais quart d'heure before the procession formed for the dining room. But champagne was then usually drunk during the meal or, as it still is in France, with the dessert.

Thereafter the sherry aperitif party, said to have been devised by Carl Williams of Williams and Humbert, only caught on in the late 1920s, and was to a great extent a by-product of the world slump, when cocktails had become too expensive for most people. Although Garveys claim to have invented the name Fino and sent a consignment to Dublin in 1823, completely dry Finos have only been consumed in Britain on any scale for the last 40 or 50 years; and certainly substantially nowhere else, as those who have been offered sweetish sherry on the Continent will almost certainly confirm.

Even today the general estimate is that only 10-12 per cent of sherry consumed here is Fino, and not all of that will be bone dry, as are such wines as Gonzalez, Tio Pepe, Garveys, San Patricio, Valdespino's Innocente, Sandeman's Innocente, La Riva's Tres Palmas and Domesq's La Ina, which used to be slightly sweeter here than in Spain, but is now identical everywhere.

Along, perhaps, with dry Oloroso, a sherry producer's chief pride is in his Fino, and this is what he himself will drink daily, although much of his house's business will be in sherries, to which some sweet

wine from the Pedro Ximenez grape will have been added: about 5 per cent for "medium" sherries and amontillado, 15-20 per cent for the creams. Cheaper sherries will be sweetened by less expensive grapes, and given additional colour with wine that has been "boiled to concentrate it."

As is well known, basically there are only two types of sherry: Fino and Oloroso,

be less strong than here.

These days, however, the decision as to whether the wine is going to be a Fino or an Oloroso is often taken before the grapes are pressed, depending largely on the origin of the grapes, and perhaps on the age of the vines. Certain districts make better Finos, others are more suitable for Olorosos. Those nearest the sea in Bilbana are thought to make the

WINE

BY EDMUND PENNING-ROWSELL

although there is a rarity, Palo Cortado, which in style is between an Amontillado and an Oloroso. A good deal of play has been made in the past about the "mystery" as to whether a butt of sherry will turn out a Fino or an Oloroso. The former "grows" a film of yellowish-white yeast cells, called flor, that covers the surface of the wine in the butt and prevents the air getting to it. The latter shows little or no flor, and to prevent any developing, the wine is immediately fortified up to a strength of about 18 per cent, whereas except for an extra dose before shipping Finos are only increased to 15 per cent; with the result that Fino drunk in Jerez is likely to

best, freshest Finos. Manzanilla from around Sanlúcar de Barrameda, just near the sea, is really a very crisp Fino. Slightly further inland is Matarnudo, celebrated for its Oloroso, but also producing Finos, while Carlsberg, deeper in the country, is for Olorosos.

Now that the wine is increasingly fermented in stainless steel vats rather than in casks this has greatly reduced the uncertainty as to how a particular wine is going to turn out. Indeed, there are those who say that the rare Palo Cortado, which only turns up in one out of perhaps several thousand butts, has almost been eliminated. Sandeman told me that it can take up to two years

to detect a butt of Palo Cortado in the bodega, and this is scarcely commercial these days. Readers of this column will be aware of the operations of the solera system, by which sherry after a year or so in cask, the *anada* stage is fed into the "nursery" (*criadera*), series, called scales. These may vary in number from firm to firm. While Sandeman's Apitivo Fino passes through three scales, and Gonzalez Tio Pepe four, Valdespino's Innocente takes five to six years and Garveys's San Patricio seven to eight. It will be appreciated that as no more than a quarter or a third is withdrawn at a time from a cask it is impossible to give accurately the age of a sherry, and these figures are approximate. It is from the final *solera*, stage that the wine is drawn off for bottling, and it is the special quality of sherry that provided not to much is withdrawn a year from a quality in each replenished butt remains constant.

The great aim in producing Fino is to evolve a sherry that is delicate in aroma, light, elegant and crisp on the taste. That is why, in my view, it is a pity to add any sweetening to a really dry Fino too bitter, and its floweriness has become oxidised—especially in bars and restaurants, which is why in Jerez bars Finos are served in half-bottles.

I myself have found it worthwhile when opening a bottle of top-class Fino straight away to pour half into a clean half-bottle and stopper it with a tapered cork.

Those who like a Fino that is perfectly dry but more full-bodied than some may choose La Riva's Tres Palmas or Don Zolito Fino. This quality is probably the result of including rather older wines in the blend. Personally I am inclined to prefer, at least for summer drinking, the younger Finos, as they are very refreshing.

In this style of sherry the Manzanillas are particularly attractive, though because of their lightness and, as some say, owing to the proximity of the sea near which they are matured, their cellars are reputedly difficult to handle. There are even those who claim that they must be drunk on the spot. However, I was assured in Sanlúcar itself by the distinguished firm of Barbado, celebrated for its Manzanillas, that if properly bottled and stored in bulk—an authentic Manzanilla will remain fresh for 12 months.

These top-class Finos are likely to cost between £2.50 a bottle, and in terms of the extended, expensive method of production and fine quality, they are excellent value for money.

Piggott aiming for a double

THERE IS no faster-drying horse in the country than Epsom, and following further uninterrupted sunshine, the ground will be riding firm there today.

No animal is likely to be better suited by the conditions

RACING

BY DOMINIC WIGAN

than Susanna, whose task under 10 st in the Padlock Stakes would almost certainly have proved insurmountable had the ground come up soft. Now that he has the going to offset that formidable weight, the additional advantage of a small field, which seems to suit him best, and the fact that he will be taking a tremendous amount of beating.

I expect Lester Piggott, who

rode one of the most polished and economical races I have ever seen from him on stableman Sam at Goodwood three days ago, to launch Susanna on a winning run close home.

Successful as Epsom has been in the summer, it will need to produce only a degree of what she has shown at home to lift the Castle Maiden Stakes; while Cymal ought to have matters very much her own way in the Ferry Stakes now that the field has cut up.

EPSOM

2.00—Murmann

2.30—Cavalry Twill

3.05—Susanna

3.40—Harvester Solar

4.10—Simla

4.45—Zerxes

2.15—CHEPSTOW

2.45—Brax

3.15—Another Sam

4.45—Marstall

4.15—Chads Gamble

4.45—Cymal

SCOTTISH

10.00 am Treasures in Store, 10.25 The Last Islands, 10.50 Portrait of the Artist, 11.00 Last Islands, 11.20 The Bubbles, 12.30 pm Against the Wind, 1.20 News and Road, 1.50 Weather, 2.15 Sports, 2.30 Crossroads, 2.50 News, 3.00 Soundings, 3.15 News, 3.30 Encare for the Arts, 12.10 am Late Call.

SOUTHERN

9.30 am Human Face of China, 11.00 Sporting Chat, 11.20 To Theatre, 11.40 News, 12.00 Last Islands, 12.30 pm Against the Wind, 1.20 Southern News, 2.00 Houseparty, 3.45 The Secret, 4.10 News, 4.30 The Undersea Adventure of Captain Nemo, 6.20 Crossroads, 6.50 Day by Day, including Southport.

TYNE TEES

9.20 am The Good Weather, followed by North East News, 10.00 George Hamilton IV, 10.20 News, 10.40 Circus, 10.55 Roses Cricket, 1.20 pm North East News and Lookaround, 1.50 News, 2.00 Crossroads, 2.30 News, 2.45 News, 3.15 The White Line, 3.30 Sympson, 10.20 Weather, 12.10 am bedtime.

ULSTER

10.00 am Treasures in Store, 10.25 The Last Islands, 10.50 Portrait of the Artist, 11.00 Last Islands, 11.20 The Bubbles, 12.30 pm Against the Wind, 1.20 News and Road, 1.50 Weather, 2.15 Sports, 2.30 Crossroads, 2.50 News, 3.00 Soundings, 3.15 News, 3.30 Encare for the Arts, 12.10 am Late Call.

WESTWATER

10.00 am Survival, 10.25 Redundant, 10.50 The World of Wonders, 11.50 The World of Wonders, 12.30 pm Against the Wind, 1.20 News and Road, 1.50 Weather, 2.15 Sports, 2.30 Crossroads, 2.50 News, 3.00 Soundings, 3.15 News, 3.30 Encare for the Arts, 12.10 am Late Call.

YORKSHIRE

10.00 am Survival, 10.25 Redundant, 10.50 The World of Wonders, 11.50 The World of Wonders, 12.30 pm Against the Wind, 1.20 News and Road, 1.50 Weather, 2.15 Sports, 2.30 Crossroads, 2.50 News, 3.00 Soundings, 3.15 News, 3.30 Encare for the Arts, 12.10 am Late Call.

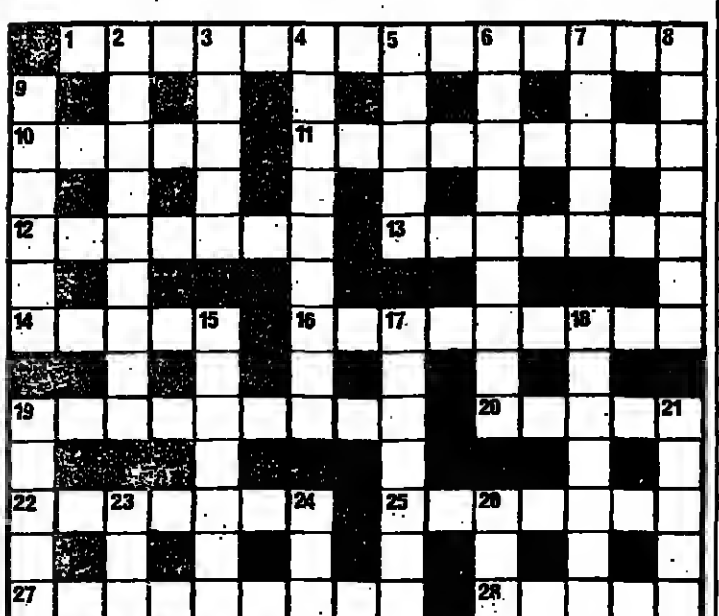
TV/Radio

† Indicates programme in black and white

BBC 1

6.40-7.55 am Open University (Ultra high frequency only), 10.00 Noah and Nelly in Skyland, 10.30 Jackanory, 10.40 The Perils of Penelope Pitstop, 10.40 Take Hart, 1.30 pm Trumpton, 1.45 News, 2.50 Dechrau Canu Dechrau Gamlod (Welsh hymn-singing), 3.25 Home on Station with Roy Marsden, 4.15 Regional News for England (except London), 4.15 Play School (as BBC2 11.00 am), 4.40 Battle of the Planets, 5.00 Newsround, 5.10 Stopwatch, 5.35 Fred Basset, 5.40 News, 5.55 Nationwide (London and South East only).

F.T. CROSSWORD PUZZLE No. 4357



- ACROSS
- Insignificant amount of marine decrease (4, 2, 3, 5)
 - Save up space for the rest of the motorists (3, 2)
 - Retreat from city persecution in Cornwall (9)
 - Backsliding to right? Please adjust (7)
 - There's maybe still me to inform incorrectly (7)
 - Craftsman not employed by Thatcher (5)
 - Bound to embrace a Turkish leader who's indebted (9)
 - Left pudding as too sugary (9)
 - Stay on pitch by railway (5)
 - Has a go at giving food to the French (7)
 - Lord that is right before this (7)
 - Mail a lord might deliver to beast (9)
 - Curtain for doctor to copy (5)
 - Expel the OBEs on transforming local centres of communication (9, 5)
- DOWN
- Magnificent carman in the shade (5, 4)
 - Foot the bill for salary increase (3, 2)
 - Naval officer acting as starter (6, 3)
 - Stalk tug going by Maidenhead (5)
 - To the other side of showplace, we hear, by mistake (9)
 - All right to enter the day before call up (5)
 - Want student newsmen to be irritated (7)
 - Drink to Cambridge college before tea (6)
 - Stole stock in saddle and managed to procure (7, 2)
 - Inflamed chap quita a few consider supple (8)
 - End tenancy during tea-break (9)
 - Survive teeth to go at Lords (7)
 - Chap from the minster, perhaps, that batsman may find awkward (9)
 - Shown on left of animal (5)
 - Shots enabling Sarah to win (5, 5)
 - Travelling round wild west show (5)
- The solution to last Saturday's prize puzzle will be published with names of winners next Saturday.

- Radio Wavelengths
- 103.5kHz/225m
 - 103.5kHz/225m
 - 121.5kHz/247m
 - 90.92kHz stereo
 - 88.3kHz/423m
 - 88.3kHz/423m
 - 200kHz/1500m
 - 42.95kHz
- RADIO 1
- (A) Stereo/Phonetic Broadcast
- 5.00 am As Radio 2, 7.00 Mike Read, 9.00 Pat Powell, 11.00 News, 12.00 News, 12.30 News, 1.00 News, 1.30 News, 2.00 News, 2.30 News, 3.00 News, 3.30 News, 4.00 News, 4.30 News, 5.00 News, 5.30 News, 6.00 News, 6.30 News, 7.00 News, 7.30 News, 8.00 News, 8.30 News, 9.00 News, 9.30 News, 10.00 News, 10.30 News, 11.00 News, 11.30 News, 12.00 News, 12.30 News, 1.00 News, 1.30 News, 2.00 News, 2.30 News, 3.00 News, 3.30 News, 4.00 News, 4.30 News, 5.00 News, 5.30 News, 6.00 News, 6.30 News, 7.00 News, 7.30 News, 8.00 News, 8.30 News, 9.00 News, 9.30 News, 10.00 News, 10.30 News, 11.00 News, 11.30 News, 12.00 News, 12.30 News, 1.00 News, 1.30 News, 2.00 News, 2.30 News, 3.00 News, 3.30 News, 4.00 News, 4.30 News, 5.00 News, 5.30 News, 6.00 News, 6.30 News, 7.00 News, 7.30 News, 8.00 News, 8.30 News, 9.00 News, 9.30 News, 10.00 News, 10.30 News, 11.00 News, 11.30 News, 12.00 News, 12.30 News, 1.00 News, 1.30 News, 2.00 News, 2.30 News, 3.00 News, 3.30 News, 4.00 News, 4.30 News, 5.00 News, 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EDINBURGH FESTIVAL

Il Matrimonio Segreto

by DAVID MURRAY

Perhaps the opening of Cologne Opera's *Costa* for this last week was compromised by the usual difficulties attendant upon squeezing into the King's Theatre. On Saturday no visible sacrifices were required in their production of Cimarosa's *Secret Marriage*, which went with unflinching brio. There were two late defections from the cast, but the producer Michael Hampe has staged the opera for the Drottningholm Festival too, and was able to summon Eric Sæden and Peter Christoph Runge from his Drottningholm cast to fill the roles with practised assurance.

It was a performance to persuade one that in *Matrimonio Segreto* Cimarosa, Mozart's Neapolitan contemporary, really wrote a light comic masterpiece to match and even excel those of Rossini. With the Scottish Chamber Orchestra in superb form, John Pritchard discovered central marvels of wit and timing in the score (much more string-centred than any but the earliest Mozart, but teeming with invention). I had not paid proper attention to this music before; perhaps it needs—and certainly deserves—a production as freshly, mischievously observant as Hampe's.

of old Geronimo (Saeden, a cultivated bass, impeccably funny and gentle) to secure the marriage of an English milord to one of his daughters; unfortunately the milord prefers the other, who is secretly wed already to Geronimo's assistant, for whom Geronimo's booming sister yearns—and the firm's cash-flow depends on her. With the expected succession of contretemps Hampe finds a further level of slyly family comedy, and characters elaborated beyond Cimarosa's quick sketches. There was a memorable breakfast of concealed cross-purposes with the sisters and their difficult aunt (warm, full-blooded attack from Marta Szymay). Runge, who relishes some vocal graces that recall Hermann Prey, grieved his vacillating milord less, probably, than the libretto expected, and remained marginal to the domestic imbroglio.

The American Barbara Daniels made a suitably dangerous unmarried sister, and Kristina Laki lent her fresh soprano to the secret bride. As her husband, David Kneibler proved to be an enormously accomplished comic actor as well as a clear and stylish tenor (with exemplary Italian diction). This is a first-class Festival offering, and it ought somehow to be got to London.

Dingley Hall

by GILLIAN DARLEY

Every year the prospect of keeping a great house in family occupation becomes increasingly impossible. More and more distinguished houses are being added to the alarming list of deteriorating mansions—given up by their owners, unwanted by anyone else.

For this reason the restoration of Dingley Hall, just outside Market Harborough, in the Northamptonshire border, is of more than passing interest. Vacated in 1960, the house went rapidly downhill. The owners sold the surrounding estate, but kept the house and parkland. Dingley Hall, a romantic amalgam of a 1550s house (superimposed on an earlier castle) with an immaculate classical addition by Hugh May, dating from 1680, was stripped. Despite its status as a Grade I listed building, a scandalous desecration took place: roof slates, principal timbers, staircases and interior fittings, all went.

When Kit Martin, who works with architect Bob Weighton in Cambridge, came upon the house in the mid-1970s it was a shell. The 16th century part of the house—the gatehouse and the wing behind it in particular—was in dire structural condition. The rest was a shell with only the principal load-bearing walls still intact. Martin was not slow to see the potential of Dingley Hall, but time, in the shape of the rate of disintegration of the fabric, was not on his side.

Dingley Hall, in addition to its 16th and 17th century elements also had been given sizeable 19th century additions. As expression of the last major, confident, change carried out by the Victorian wing was symbolic. However, for Martin's purposes it was impracticable. The first move was to render the house feasible for conversion into a number of self-contained houses and flat units—therefore removal of the undistinguished service wing was inevitable.

While the position of the remaining internal walls to a large extent dictated the way in which the conversion should take place, the condition of the building dictated the way in which the phasing should operate—for since Martin was financing the exercise himself, as well as designing it, there was no possibility of carrying out the works in a single programme.

By phasing there has been an added advantage, since the specialist builders and craftsmen have been able to follow each other round from stage to stage.

Phase 1 concerned the 16th century wing. Since it was a shell Martin was able to insert a complete steel structure allowing for far greater freedom of design than would have been the case within the circumscribed spaces of the original interior. That formed a single family house, the first of the ten units within the Hall itself (there is also a separate single storey unit). Now five more families are in, another unit is sold and the last phase, three houses in the central wing, will shortly begin. Oddly, as the houses and flats have come on the market all the old servants' quarters have proved wrong. Large flats in a country setting have proved to be extremely popular; small units have presented no problem.

The beauty of the house, with its immaculately restored gardens and parkland (which will be maintained as a joint responsibility of the residents), and the quality of the restoration, the estate agents have meant that there has been no problem whatsoever finding buyers.

Various general points emerge from the story of Dingley Hall. One is that the splitting of a house, provided it is carried out with a proper sensitivity to the character of the building, need in no sense tamper with the integrity of the building. Where Martin has divided wings, vertically or horizontally as the case may be, the entrances have been kept together on the eastern courtyard side. The plan of the house, two courtyards back to back, has assisted this arrangement. The grandeur of both south and west fronts remains intact.

Another point is that without the limitations of internal features, conversion is made easier. Both on historic and spatial planning grounds there are fewer potential obstacles. As a self-financing project, the phasing has made great sense; but Martin feels bitter over the obstacles and local planners raised by the Historic Buildings Council. The building fell apart as the discussions continued. It could have been lost.



A scene from the Salzburg production of 'Die Entführung aus dem Serail'

Cathedral treasures

by ROY STRONG

This Thursday will see the opening of a festival in Hereford Cathedral entitled *Flowers and Treasures*. Over the flowers I do not intend to linger, but for a few brief days the nave, aisles and chapels of this venerable building will be the setting for arrangements of garden flowers by groups representing parishes right across the diocese. Few activities are more typically British than the transformation of an historic environment into a bazaar to Flora. The explosion of blossom, however, signals the inauguration of a cathedral treasury in the crypt below the Lady Chapel.

Few movements have been more important in the last 30 years than the establishment of treasuries. They owe their initial impetus to that doyen of the history of ecclesiastical plate, Charles Oman. In his classic book, *English Church Plate 597-1890* published in 1957, he wrote:

It would seem well worth considering whether it might not be possible, by the foundation of diocesan museums such as exist in many continental countries, to bring into the light of day much of the plate which of present remains unused and unseen. Many of our ancient cathedrals could find space for one without great difficulty, while some must still have their medieval treasures which could be brought up to date with regard to security without much trouble.

Such treasures, he goes on to say, would not only attract visitors but make the clergy, especially those of the younger generation, aware of their responsibilities as custodians of works of art.

That this idea found fruition was entirely due to a happy combination of circumstances that brought together the author and the Rev. Peter Hawker in creating one at Lincoln in 1960. More significantly the enthusiasm of Mr. George Hughes persuaded the Goldsmiths Company to finance it, and thus began the very important contribution by that company to the setting up of them throughout the cathedrals of England. Their help has varied from total subscription to a contribution which has made such a venture possible.

In the case of Hereford an initial grant of £5,000 enabled the appeal to get off the ground. Their interest too has ensured in many instances the use of distinguished designers. In particular, Alan Irvine and Stefan Buzas, which has resulted in a high level of presentation compatible with the glories of cathedral architecture.

In 1968 Winchester followed

and, after a lull, came a great spur in the 1970s. Norwich (1973), Oxford, Chichester, York, Ripon (all 1976), Durham (1978) and, this year, Canterbury. Plans for Peterborough are already far advanced as are those for a major one for the diocese of London in St. Paul's.

The object of a treasury is a very simple one, principally to place on display the hidden and unused plate of the cathedral and churches of the diocese. In size they vary tremendously. The largest must be York, which stretches to the form of a panoramic history of the cathedral and diocese, beneath the cathedral, and in this way stands somewhat apart from the others.

One of the most modest must be Norwich, which floats on a neoplane above an aisle housing two handsome cases of plate. Some charge, others depend on voluntary contributions, but in either case 10p seems to be the norm per head at least. In every instance they have been found to be financially self-supporting and the proceeds are disposed of by the Dean and Chapter to causes as various as Christian Aid or the maintenance of the fabric. Most open at Easter and close in October and most, too, try to vary the exhibition from year to year. Increasingly there is a tendency to widen the scope of exhibits to include items as varied as vestments, mediaeval carved fragments, and stained glass.

A year ago I had the privilege of opening that at Durham. Up until then its treasures had been very inadequately shown in the Monk's Dormitory, a dreary clutter in the true Victorian museum sense. The average visitor would have been left totally oblivious of treasures of truly international importance: the carved coffin lid of St. Cuthbert, the unique Anglo-Saxon considered stole and pectoral cross; or the precious survivals from its Laudian heyday, music books and a cope reflecting the splendour of the Caroline liturgical revival. These are now

displayed in a treasury, albeit too small, opposite that other phenomenon of the period, the cathedral shop. Here the atmosphere is that of a modern museum and the darkness not only presents these precious items to advantage but ensures that modern standards in respect of manuscript and textile conservation are fully met.

At Hereford Stefan Buzas has skillfully designed a series of monumental showcases between the aisle arches, thus preserving the rhythm of the crypt chapel with its altar at the east end. Permanent pieces of plate will go to the early 13th century Limoges enamel reliquary depicting scenes from the life of St. Thomas à Becket, an object worthy of any of our national collections. The remainder will be given over to a changing exhibition drawn from the many hidden treasures of the Hereford parishes.

One final word. A cathedral treasury should not be a dead thing, which in many ways its encasement instead of use of things past seems to imply. The Church of England since the war has been so obsessed with brass-boots over its earthly possessions that to a degree it has led to a killing off of the visual imagination put back into it by the Oxford Movement. Few periods have produced so little in the way of church furnishings and what little has been produced is often apologetic, mean or passic.

For most of this century the Church has been disoriented by the modernist movement which has destroyed its vocabulary of images as it has struggled to come to terms with abstractionism. With the return of the figurative in the arts endless possibilities are now open for a renaissance. The treasures should play a vital part in exhibiting from time to time what is new and thus contribute to the re-establishment of the role of the visual arts in religion.

Contemporary Music Network concerts at the Round House

During the period October 1980-March 1981 the Round House, London, NW1, will present concerts by all the groups touring next season with the Arts Council's Contemporary Music Network. Ten of these will be the opening concerts of the tours.

Performances by the 12 groups will make up a subscription series, the first such series of contemporary music to be promoted by the Round House. This will be the first season, since the Network started in 1972, that all the groups will have appeared in London.

The concerts, all on Sundays starting at 7.30 pm, begin on

October 5 with Turning Point, with Neil Ardley and Allan Holdsworth. The final concert, of Janovics' music, past and present, will be on March 15.

In line with the expanding educational role of the Contemporary Music Network, each concert will be preceded by a workshop, lecture or demonstration at the Round House, arranged by the School of Adult and Social Studies, Goldsmiths' College.

Further information from Thelma Holt, Director, Round House, Chalk Farm Road, London NW1 01 287 2541; or William Henderson, Music Department, Arts Council.

Salzburg Festival—2

Mozart operas

As everyone knows, Mozart is more assiduously cultivated in Salzburg than he ever was when alive. No one need sneer about "bad conscience"—we may rather be grateful for the devoted care that the modern Festival has lavished upon Mozart's operas above all, maintaining a standard by which perpetrators of shoddy or insensitive productions can be judged. Not every Festival year is a vintage one, however: this summer's *Entführung aus dem Serail*, newly staged by Filippo Sanjust, was only a notch or two above an ordinary one. I did not see the revival of Ponnelle's *Figaro*, which was widely reported to have gone off. Fortunately the 1978 *Zauberflöte*—also by Ponnelle, and appreciatively described on this page by Ronald Crichton when it first appeared—was still in stock.

Perhaps Sanjust was daunted by the challenge of following Giorgio Strehler's famous Salzburg *Entführung*, or perhaps he simply lacked theatrical ideas. The distinction of Strehler's version, admitted even by those of us who thought it came near to a simplifying prettiness, lay in its strict stylistic consistency. He solved the "problem" of *Entführung*, which he took to be its juxtaposition of lively, natural action with archaically formal arias, by freezing the action into silhouette for each solo number—like a stop-frame with musical commentary. Sanjust contented himself with exercising his designer's *métier* enthusiastically in the settings, which display just enough fresh touches to lift them above conventional exotic pastiches (his familiar delight in peeling walls is evident throughout the *harem*), and—so I guess—honed that his performers would think of nothing but to do it.

Nobody did, though presumably Sanjust himself was responsible for the briefly exciting escape over rooftops on the revolving stage. The comic-dramatic numbers of *Entführung* that cry out for

inventive business were left flat. The Act 1 finale, where Belmonte and Pedrillo successfully evade the blustering Osmin and enter the palace, was inept and unconvincing; there was no infectious mirth in the bibulous "Vivat Bacchus" duetting of Pedrillo and Osmin. Proper melodramatic tension was quite absent from the *dénouement*, where the part of Frank Hoffmann's tormented Pascha had been so rudely cut that he was impotent to help, and Osmin's final exit was extraordinarily limp.

The musical dimension was more rewarding, though uneven, and in the case of Peter Schreier's Belmonte virtually independent of the opera. Schreier delivered his arias with studied refinement, and made only token contact with his fellow performers. He or his conductor Lorin Maazel, or both of them, chose to take "O wie Ängstlich" as slowly as to nullify the anxious heart-beat effect of which Mozart was so proud. Pedrillo was Norbert Orth, who offered an unusually truculent "Früch zum Kampfe" to some effect, but also a graceless *Romanze* which Maazel chose to provide with perhaps the loudest mock-mandolin accompaniment ever heard. Maazel's work was puzzling; a brilliantly vivacious overture, a fine, bristling Act 1 finale, a "Vaudeville" at the end which was a charming benediction—but also an Act 2 quartet in dissonant seconds (the most sustained dramatic music of the opera), and the *sinfonia cantata* of "Märtern aller Arten" made into a breakneck stunt.

Perhaps Ilseana Cotrubas, the Constanze, finds "Märtern" best manageable at that implausible speed; she invested it with defiant ardour and clear scales, though no semblance of a real trill—a grammatical failing here. Her plangent "Traurigkeit" followed an "Ach, ich lebe!" that was uncomfortably touch-and-go, she had not yet made Constanze's idiom her

own (and she puts a tediously lachrymose face on the lady). In this company, Carol Malone's naive singer Blonde seemed over-parried. Nature obviously intended Martti Talvela for the role of Osmin, though he was under-directed and his lowest notes were mostly promissory.

This same *Entführung* will be easy to forget. The Ponnelle *Zauberflöte* continues to prove its staying-power, astutely designed as it is to light up the cavernous Felsenreitschule (the old "rocky riding school," carved, as they say, out of the living rock of the Mönchsberg). Some of its original cast remain. Presumably the Three Boys from the sterling Bad Tölz choir are of a new generation. It is a particularly happy feature of Ponnelle's vision that they are not demure cherubs, but volatile sub-pretects who face about and give mischievous prods. For her part, the new Pamina, Lucia Popp, the new Papageno, is rather forbiddingly assured and mature; what has this self-sufficient Pamina to fear or to learn? She is a tougher proposition than Zdzisława Donat's cautious Queen of the Night. Talvela begins to sound bored with the part of Sarastro, impatient to get on with successful lines of a verse before their preceding ones have had their full measure.

The sudden illness of the announced Papageno brought us Walter Berry's ripe caricature inated, and in his place José van Dam as powerfully persuasive Speaker. I should have admired James Levine's ducting just temple, adroitly balanced sonorities still more bad I not heard Hahn's *Zauberflöte*, richer in unobtrusive lyrical subtleties, just before leaving London—unfair, because preparing the score to be heard in the gigantic Felsenreitschule is a task of a different order from preparing it for Glyndebourne. In its own broader vein, the Salzburg *Zauberflöte* remains a vintage model.

DAVID MURRAY

Albert Hall/Radio 3

Tippett's new Concerto

No special precedence is needed to hail the new Concerto for violin, viola, cello and orchestra by Sir Michael Tippett (given its first performance in Friday's Promenade Concert) as a masterpiece: the work's quality is dazzlingly evident on a first hearing, and one's awareness of the subtlety and inventiveness with which the music is put together only grows with further study. Tippett's Concerto is an outpouring of rhapsodic contentment, sustained without a suspicion of sentimentality or self-indulgence: its mood would have to be described as unfashionable, had it not so easily and successfully communicated itself on Friday night.

I have not always been convinced by the strenuous seriousness of Tippett's recent instrumental music. Both the Fourth Symphony and the Fourth Quartet left questions unresolved at their close: the violent arguments of the former dissolving into the uneasy pulsing of a human breath; the obsession of the latter with Beethoven's *Grosse Fuge* giving way to a remote, uncertain lyricism. Now we can see the world that both were pointing towards: we have Tippett's own declaration that a passage near the end of the Quartet provided the direct inspiration for the conversation of the soloists in the new Concerto: the end of the Symphony, too, now seems to lift the veil on a new vision of sensual peace.

The formal preoccupations of the Concerto are similar to those of the Symphony, but the expressive content is radically different. The Concerto is in one movement; three sections linked by two interludes. Needless to say (or rather, in this

most difficult of mediums, it needs saying that) Tippett has laid out the score with consummate skill: the soloists, together and apart, are always audible. The opening section introduces a Mozartian wealth of material: yearning, expressive, double-stopping for the viola; bright, cascading passage-work for the violin; singing, straining phrases for the cello. Then follow blocks of material typical of Tippett: based in turn on acerbic brass writing (the only reminder of the fast fading world of the Symphony); a crisp and then drooping interval of a major ninth, played by violin and cello soloists with glissando ("singing, let breathe"); and a quiet rhythmic ostinato, which the three soloists interrupt with a lively, jazzy phrase. All the material is rearranged and developed, with the three initial solo statements interspersed in its midst.

The exquisite first Interlude is no more than a pianissimo flutter of marimba, barp and nine solo violins, and a delicate tinkling of alto flute, clarinet, celeste and glockenspiel. Then the central section of the work, 10 minutes out of its half-hour length, but bearing the main emotional weight—introduces an audaciously simple tune for the three soloists in unison, with a modal Ballad oriental tinge (inspired, it is said, by the music of Bali). This, it is interrupted by ruminative colloquies: first in cello with bass oboe; then for violin with alto flute. As throughout the work, other instruments tinge the solo lines with extra resonance and colour. The passage of the central melody grows, and twittering muted and pizzicato violins cluster round it; then

there is a sudden break, and a pungent Interlude for percussive blow, away their assertive triplets in little roulades leads to the last section.

Even here, there is much new melody before Tippett embarks on the expected recapitulation: an intense line for solo cello and a "singing, rich and golden" tune for all the strings. There is a tiny reference to the lyrical world of the *Minamur Marriage*, a cheerful little Beethovenian rhythmic tag pushes the music along. Then it disintegrates, and in a hypocrite couple of minutes it rebuilds itself over a new rhythmic pattern. Much compressed and forestalled, the open sections of themes are recalled; the soloists sing out last ecstatic outburst, and the sounds peter out into clipped, desiccated notes.

On Friday, the Concerto was played with supreme confidence and understanding by the three soloists: Ralph Kirshbaum found the depth and power of the cello's lines, Lubov Ismail an astonishingly powerful viola soloist, and György Kurtág, in his duet with the alto flute did the precision of the performance slip. Orchestral soloists were first-rate; Sir Colin Davis was subdued but most efficient. This is a work which it is easy to love without reservations: indeed, that much misused adjective "lovely" seems precisely appropriate to describe its allurements. After a period of fruitful experimentation, Tippett seems in this piece to have found again a natural, wholly individual world of expression. The work is attractive, original, coherent: we must bear it often.

NICHOLAS KENTON

TENNIS by JOHN BARRETT

Doubts about Borg's grand slam fitness

THE U.S. OPEN championships, the third of the four traditional grand slam events, opens today at the U.S. tennis centre at Flushing Meadows amid speculation about the fitness of the top men's seed, Björn Borg.

The Swede, who won the first two legs of the grand slam with a record 5th title both in Paris and Wimbledon earlier this year, had to withdraw from the final of the Canadian championships against the young Czech, Ivan Lendl, nine days ago. He had a knee injury and blisters on his racket hand.

That was his first tournament appearance since Wimbledon because of his marriage to Marianne Simonescu, and was intended as a warm up for his U.S. Open challenge in New York—the only major title that has eluded him.

Fierce serve

Curiously, it was a badly blistered hand that contributed to his defeat at the hands of Jimmy Connors in the 1978 final—the first year at the new centre on the fast Decoturf asphalt surface. Although Borg's convincing Masters victory last January broke the jinx that always seemed to pursue him in

New York, the draw has been unkind to him again. In round two he will have to face the fierce serve of John Sadri, who upset so many grand players at the start of the season. In the quarter-finals he can expect another meeting with Rodcor Tanner if the Tennessee left-hander can beat Miami's Eddie Dibbs.

Essential

Significantly it was Tanner who put out Borg last year under lights at the same stage. Once again, there will be evening sessions under floodlights for the first ten days and Borg, who claims he cannot sight the ball properly in those conditions, will doubtless hope his obligatory night match will be against a lesser server.

While the USTA claims that night play is essential both to pay off the loans still outstanding against the cost of constructing the centre and to satisfy the normal expectations of New York sports fans, many players feel it is unfair to be asked to compete in two different environments.

Certainly it makes good commercial sense to open the gates

twice in a day. Last year the 23 sessions brought 305,311 paying customers through the turnstiles—only 40,000 short of Wimbledon's average attendance for the 12 days of play.

If he survives to the semi-final, Borg will face either last year's finalist, Vitas Gerulaitis, the American who has never beaten him in tournament play, or the Argentine left-hander, Guillermo Vilas, now fully restored after the removal of his appendix in June.

In the lower half the number two seed and defending champion, John McEnroe, has a much easier task on paper. Last week's first round loss to John Austin, Tracey's brother, is not significant in assessing his chances here, where the giant Victor Amaya will probably be his toughest hurdle before a prospective quarter-final against Harold Solomon, the winner on Sunday of the ATP championships in Cincinnati, or Lendl.

Line up

In the semi-final McEnroe is seeded to face his old rival Connors which would be a repeat of last year's match won comfortably by McEnroe. If the main seeds all get

through, the quarter final line up will be Borg (1), V. Dibbs (8); Vilas (4) v Gerulaitis (5); Gene Mayer (U.S. 6) v Connors (3); Solomon (7) v McEnroe (2).

Prodigy

The defending women's champion, Tracy Austin, is strongly fancied to win again on her favourite surface—despite the jolting loss she suffered last week in New Jersey at the hands of her successor as infant prodigy of the U.S. game, 14-year-old Andrea Jaeger. Miss Jaeger herself was beaten in the final of that tournament by the 18-year-old Czech Hana Mandlikova, who in the course of her successful run had beaten Dianne Fromholtz of Australia, and her girlhood idol and former Czech Number 1, Martina Navratilova.

Both the third and fourth seeds, Chris Evert-Lloyd and Evonne Cawley, have relatively easy tasks in the quarter-finals where the matches forecast by the seeding committee are Austin (1) v Fromholtz (16); Lloyd (3) v Greer Stevens (S.A. 7); Jaeger (8) v Cawley (4); Turnbul (5) v Navratilova (2).

CRICKET by TREVOR BAILEY

England look set for Centenary victory

ENGLAND, as expected, won the two one-day Prudential internationals without much trouble. The Australians had not really come to terms with the requirements of limited overs cricket. Their captain, Greg Chappell, plainly does not enjoy this form of the game, and does not believe that it pays to bat first on an easy-paced wicket, and finally some of his field placements were naive.

Geoff Boycott could hardly have believed his eyes when, on 18, and just settling down to produce one of his spectacular innings, he saw six fieldsmen dotted around the boundary, meaning there was a single for the asking whenever he wanted it.

Although the requirements for Test and limited overs cricket are different in many ways, there could be no disguising certain fundamental weaknesses in the present Australian party. These were also very apparent in their first class match against Nottingham, suggesting that they have reached the end of an era and will need to rebuild when they come to England next summer on a full tour.

After the sustained speed and menace of the West Indies, the Australian pace attack, though Lillie clearly remains a

magnificent bowler, is comparatively mild, and both Gooch and Boycott obviously enjoyed systematically taking it apart.

Thomson is still seeking a smooth run-up which is essential if he is ever to groove his slinger's body action. Without that, he can never achieve the consistent accuracy he now requires, while Pascoe is a straightforward quickie. In addition, it is hard to see either of their spinners, Bright or Mallett, unduly worrying any of the England batsmen, while their fielding is sub-standard and I cannot recall any Australian team spilling quite so many catches.

As a result, I expect England to win the Centenary Test at Lord's, though Greg Chappell, if he has recovered from his injury, is capable of scoring a century against a stronger attack than our own, and Wood, Hughes, Yallop and the very promising Border can all make runs.

With Rose until our selectors have recalled the talented Gower, who has not produced the runs for Leicestershire which his ability warrants, he certainly ought to go to the Caribbean this winter. They have also picked Athey, who batted impressively in both one-

day internationals and gains his first full cap.

From the England angle the most satisfactory feature this summer has been the advance made by several good county batsmen, who one hopes will develop into true Test cricketers. However, it should not be forgotten that eight of the top 10 places in the first class averages are occupied by overseas cricketers. The only England players under 25 in the first 23 are Botham, R. Butler, and ironically two discards, Larkins and Tavare; while Willey, with an average of 23 and his wickets costing 37 apiece, must, in some respects, be lucky to hold his place, especially as his Northants colleague, the exciting Willingham, has been scoring heavily and spins his off-breaks rather more.

The most worrying feature of the England XI is their pace attack. With Dilley ill and Willis out of form, we rely on three fast-medium bowlers, Old, Hendrick and Jackman, who are all on the wrong side of 30, plus Botham, who seems to have lost much of his speed and swerve.

This could still prove sufficient against the Australians, provided the Lord's wicket is

not as placid as the one at Edgbaston, but it does not augur too well for the West Indies tour this winter, where the ball does not seem as much as ever here.

This summer, Botham has been hampered by injury and lack of bowling, but what has happened to his late swerve? This ability has been the key to his great success as an attacking bowler and largely responsible for the 150 Test wickets he has taken so quickly. Without his deceptive swing, which turned a half-volley into a potential wicket-taker, he becomes just another fast-medium seamer.

It is to be hoped that he rediscovers the art of swerve quickly, yet it is not always that simple. I remember Massie, who devastated England with his swing and then abruptly lost it all, so that he faded not only from the international scene, but from first-class cricket.

Although this could not happen to Ian because he is also an outstanding stroke maker in his own right, England certainly cannot afford to lose their most penetrative bowler, especially when there is such an acute shortage of new ball bowlers of international quality.

The West's priorities

AS WESTERN leaders grapple with the problems of recession, unemployment and inflation, they have been largely ignoring the connected but bigger challenge of shaping a world less plagued by economic uncertainty and widespread poverty. This second issue is now the subject of a special session of the UN General Assembly which is beginning this week in New York. The format is unimpressive. All past rounds of negotiations between the industrialised North and developing South have ended in frustration and mutual suspicion with the main result a small and still untested fund to stabilise commodity prices. Now too energy has been dissipated on the session's agenda instead of tackling the vital issues at stake.

Regulation

Six months have passed since the report of the Brundage Commission focused attention on the need for concern and urgency in tackling the issues of international development. The report has been criticised, and rightly so, for scattering its fire too wide: for often allowing passion to displace analysis; for putting too much stress on the external factors slowing development in the Third World and not enough on domestic factors; for questionable assumptions about, for instance, the ability of governments or international institutions to regulate the world economy; and for setting a number of major but unconnected issues such as threats to the environment within the ambit of the North-South dialogue.

There has been debate over the report's neo-Keynesian view of the world economy and its proposals for automatic international taxation of items such as transfers of weapons. But even if one endorses all the criticisms, the report remains of considerable value. It provides a powerful reminder that policies and measures can be identified from which both North and South will gain. And, while stressing the responsibility of the rich to the poor, it also highlights the common interests hindering North and South.

Less aid

The gloomy forecasts for the 1980s produced by the World Bank last week underline the importance of recycling the capital surpluses of OPEC countries and of ensuring adequate flows of funds to the developing world. But the danger remains that, pre-

occupied with internal problems, Western countries will increase protectionism or react like Britain in cutting aid or like the U.S. Congress in long resisting fresh appropriations for international development agencies.

Exports

The overwhelming public response to appeals to counter famines such as those in Kampuchea shows that in this area politicians often lag behind public opinion. But where a lead is particularly necessary is in stressing the other reasons for raising horizons from the national to the international. Helping agriculture in developing countries is of mounting importance in a world with diminishing reserves of agricultural land.

Economic stability is necessary for political stability. And there is the ever-increasing interdependence of a world bound by tightening links of trade, investment and finance. One-fifth of industrialised countries' merchandise exports now go to the developing countries. For these countries to service their bank debts of over \$250bn it is crucial for them to be able to sell in the markets of the North.

There is much the developing countries can do within their own borders. There is also the need for the oil producing countries to cease neglecting the problems oil price increases cause in the Third World. But Western leaders can only stress such points if, as Chancellor Schmidt is beginning to do, they give priority to the problems of the international economy. It is probably too late for much to be expected from the special session in New York. In any case it is questionable whether meetings of this kind, covering the whole panoply of world development issues, can achieve worthwhile results. Where there are specific problems on, for example, financial or energy matters which need an international response, it is better to handle them through existing institutions like the World Bank and the International Monetary Fund—the World Bank proposal for a separate third world energy development body is a move in the right direction—but it is at the level of individual governments that the most crucial decisions affecting trade and economic growth are taken. In the developed countries there are strong economic and humanitarian reasons why the needs of the developing world should be given higher priority.

Good news on investment

ONE OF the most persistent myths in the endless debate about "what's wrong with Britain" has been that the level of capital investment is very low. This view, enshrined in the TUC inspired minority report of the Wilson Committee, has now been undermined by new official figures. These show that capital investment over the last couple of years has been about 5 per cent higher in real (inflation adjusted) terms than previously estimated.

Antidote

Britain, it now appears, has been experiencing something of a capital investment boom. Spending by the manufacturing, distributive and service sectors rose by 31 per cent in real terms between 1976 and 1979 to more than 15 per cent above the previous peak in 1974. Even in manufacturing, fixed investment rose by 22½ per cent between 1976 and 1979 after the growing use of leasing is taken into account.

At one level, these figures provide a welcome antidote to the fashionable gloom about industry's prospects. They also confirm the growing view among economists that initial Government estimates of investment and of total activity consistently underestimate the strength of Britain's performance. This is not a statistical quibble since attitudes and expectations—and what the animal spirits of businessmen are influenced by perceptions of what is happening to the economy as a whole.

The strength of investment in some respects surprising in view of the historically low level of real profits in the last few years. There is certainly scant evidence of any widespread plans to expand capacity.

A stimulus to investment may have come from the sharp rise in the real cost of energy during the last decade. But possibly the most significant factor, particularly in the UK, has been the sharp increase in the real cost of employing labour relative to the cost of purchasing equipment.

This has encouraged labour saving investment. Reports from a wide range of individual companies support this interpretation, and industrial opinion surveys suggest that the primary motive for capital expenditure is to increase efficiency rather than to expand capacity. Capital spending has held up reasonably well so far this year—only 1 per cent below the average 1979 level. To a large extent, this reflects the momentum of past investment decisions taken when the outlook for demand was brighter. A sharper cyclical drop is likely over the next 18 months.

Evidence

Significantly, uncertainty about demand and inadequate net returns on proposed spending are cited as much more important influences than financial constraints. Inability to raise external finance is scarcely mentioned—TUC please note.

There is, however, evidence that some companies are pressing ahead with modernisation plans despite the recession. Indeed, the main effort at present seems to be to cut excessive levels of stocks (with mixed success to date), to shed surplus labour and to close marginal plants. The promise is the eternal one that after the shake-out there will be a new and leaner manufacturing industry ready and eager to win new markets. So far this is merely an alluring and remote prospect, and the immediate cost of higher unemployment is more apparent. Yet the investment surge of the late 1970s cannot be ignored. It may mean that British manufacturing industry is in better shape than is often supposed.

Bad weather unsettles world grain markets

CHRIS SHERWELL considers the effect of heat, cold, drought and flood which have variously struck North America and Europe this summer. Below he looks at the problem of feeding the hungry in Third World countries

BREAK WEATHER in key agricultural areas of the world during the past few months has renewed concern about the underlying fragility of global food supplies—and made grain exchanges an unsettled "weather market."

Following a heat-wave and drought in parts of North America—and the ravages of Hurricane Allen—and a cold, wet summer in much of Europe, another year of the same in 1981, it is being said, could be disastrous.

Such weather in two important grain-growing continents has been enough to set the markets moving. Canada, the U.S. and Western Europe between them produce nearly 75 per cent (some 64m tons this year) of the world's wheat exports (almost 87m tons), while the U.S. alone produces 72 per cent (71m tons this year) of the world's coarse grain exports (88.6m tons).

In this enormous world market where grain cargoes can change ownership in a minute, the balance of supply and demand is inevitably precarious. Potential shortfalls can have a disproportionate market impact, despite carry-overs from the previous year. Unanticipated purchases of a few million tons by an importing country whose crop has failed can quickly lead to a change of sentiment.

This summer maize (corn) prices, which had declined steadily until mid-June, started to move up. In a few weeks, 20 per cent in a few weeks (from 290 cents per 50 lb bushel for December delivery to more than 350 cents) before easing slightly with the arrival of rains following the hurricane. Soybean prices rose some

30 per cent from mid-June to a few weeks ago when they also softened (from 830 cents per 60 lb bushel for September delivery to 820 cents, and easing more recently to about 750 cents).

One London dealer says all commission houses were telling their clients to buy or sell simply because of the weather, and there was some heavy speculation. "We are still bullish on grains, and especially corn," he says. "Although the overall picture is not a lot worse than last year, and there is a large carry-over, we are pessimistic about yields because of the weather."

The statistics underline these fears. Latest figures from the U.S. Department of Agriculture (USDA) show that coarse grain output in the U.S.—that is, grains used more for livestock than direct human consumption—will be well down on last year, from 234m tons to 197m tons. Corn projections have been drastically reduced, as have soy estimates. Sorghum was described by one official this week as a "complete disaster."

Wheat has been less hard hit. Winter plantings in the U.S., which supplies 47 per cent of world exports, were largely unaffected by the drought, while spring wheat, although certain to suffer lower yields, was

planted over a greater acreage than last year. As a result price movements have been less extreme and concern about wheat has been relatively muted.

The overall picture for the year shows a broad balance between supply and demand. There will be a net addition to wheat stocks, with production slightly in excess of consumption. In coarse grains consumption will again outstrip production, and by a larger margin, leading to a net fall in stocks. Total grain stocks should remain at approximately 60 days' worth, above the notional 45 days regarded by some—notably the Food and Agricultural Organisation—as the absolute minimum.

In addition, the third ingredient in world grain supplies—rice—is unlikely to be an important factor this year. Projected output of 394m tons, mostly in Asia, will be no on fast year's figure, and all but the smallest fraction will be consumed locally. Very little is traded. Indeed, rice has become an important factor in world terms when it fails and producing countries need to import wheat as a substitute.

Changing Asian diets, in which more bread and meat are consumed, are nevertheless helping to boost global wheat demand, a significant trend for the future. China, in particular,

is becoming a more serious purchaser on the markets, and will buy 11.5m tons this year after 8.8m last year.

But little comfort should be drawn from this year's apparently optimistic grain stock picture. Images of mass starvation and malnutrition in Kampuchea, East Africa and the Sahel region continue to highlight the weaknesses of the world's food supply network. For all the complex causes of these disasters—and they are political as well as agricultural or climatic—relief for millions of people has depended in the end on food being available on the spot.

Also the all-important Soviet crop remains unpredictable. Together with the prospect of a continuing Western grain embargo on the USSR because of Moscow's invasion of Afghanistan, this powerful influence is one rarely left out of dealers' calculations.

This year the Soviet Union, like North America and Europe, has been suffering from the vagaries of the weather. Hot, dry weather in southwestern areas of European Russia and southern areas of the New Lands in July, and flooding in the western Ukraine, Byelorussia and the Baltic republics, significantly reduced the country's grain prospects.

But the U.S. Department of Agriculture puts the likely crop at 210m tons, well up on last year's poor 180m tons, if short of the level produced in 1973. This means that the Soviet Union is likely to be looking for imports of about 13m tons of wheat and around 14.5m tons of coarse grains, according to USDA.

The hungry nations press for fresh solutions to shortages

THE KEY factors in assessing global food security are the actual size of world food stocks, the efficiency of distribution networks and the capacity of existing agricultural lands to meet the needs of growing populations. On these counts one cannot be sanguine about world prospects.

According to the Worldwatch Institute in Washington, an independent research organisation monitoring global problems, the overall balance between supply and demand for food has become extremely delicate. It reckons the cushion of large grain stockpiles and crop-land reserves in the U.S. has been eroded over the past two decades, with world grain stocks dwindling from 112 days' world grain consumption in the early 1960s to less than 40 days' consumption in 1973, before being partially rebuilt more recently.

The International Wheat Council argues that this assessment is misleading because it takes insufficient account of the fact that growing populations are eating more wheat as they

grow more affluent, and that trade in grains has expanded enormously—in other words that stocks alone are not a reliable indicator of world food security.

Certainly inefficiency of distribution has been an important reason why shortages of food have claimed so many lives in places like Kampuchea and East Africa. This fact has also underlined the need for countries to hold grain stocks—provided they can produce the food in the first place or at least have the foreign exchange to buy it at the going price. Many of the poorest Third World countries have neither. Nor in many cases can they store grain without losing it to the weather, pests or common graft.

International efforts to create a system of nationally held stocks are continuing at a lethargic pace. A meeting of a special committee of the International Wheat Council, for example, takes place in London in October. But progress is unlikely because of the U.S. election. No U.S. administration could commit itself to an expensive stocks programme at this point.

The urgency is nevertheless growing. In July the World Food Council's executive director stressed the need for a new international wheat agreement as the centrepiece of a strategy to improve world food security. Failing that, he said, a separate food reserve should be created, and the IMF should create a special facility to help less developed countries pay for food imports.

It is clear, however, that the only real solution is to encourage these countries to produce their own food. This is not as simple as it sounds. In countries like the U.S., how much food is produced is essentially a political issue, a question to be resolved around the negotiating table with the powerful farming lobby. Farmers are paid to withhold land from cultivation.

For the less developed countries, the problems are more complicated. Many started along the path to greater dependence on North America and Europe

when they were colonies encouraged to produce cash crops rather than food.

Desert areas are growing because of man's activities at their fringes. Marginal lands come under cultivation, animals overgraze on reduced areas, water wells encourage settlements, and dustblows are created. Even where there are sophisticated irrigation systems, the consequences of salting and silting can be enormously damaging and impossibly costly to remedy.

Food shortages and rising food prices will thus join persistent inflation and continued recession as factors contributing to political instability in the world over. In the view of the Worldwatch Institute, "unless countries can give agriculture the financial and scientific support it needs, hunger-induced death rates will probably continue to claim far more lives than military conflict." Certainly the vexed problem of world food security looks bound to become a more important international political issue in the 1980s.

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Two Texan cowboys ride past a dead steer last month after a ten-month drought.

Some signs have emerged recently that the grain embargo may be lifted, but this, if it happens, would only be after the U.S. presidential election in November and the inauguration next January. For President Carter it would also involve a politically difficult U-turn, although it is recognised that the U.S., and particularly the American farmer, has probably paid the biggest cost of the embargo.

There is now a growing feeling that if the USSR does come into the market in a big way, the U.S. should be there to meet the demand. The U.S., after all, is a willing exporter these days for balance-of-payments reasons. But as present figures suggest that Russian purchases will not be on a grand scale this year, grain dealers are expecting little impact on prices if the embargo is lifted.

The USSR is nevertheless recognised to have a problem with its coarse grains—and one that has peculiar significance because Moscow and its satellites cannot easily afford to cut back on meat production to cope. Meat shortages and high prices have provoked strikes and unrest in the USSR this year, and the present discontent in Poland has been a stark reminder of how political the subject of meat has become.

If the grain embargo is maintained, the impact on the market could be greater. But the Soviet Union would still be able to secure up to 8m tons of grain from the U.S. in the fifth year of a five-year U.S.-USSR grain agreement. Additional supplies could no doubt be bought under the counter. The USSR is thought to have made up all but about 4.5m tons of the 17m tons of grain which would have come from the U.S. this year.

THE WORLD GRAIN BALANCE

	PRODUCTION (m tons)		CONSUMPTION (m tons)	
WHEAT	1980-81	1979-80	1980-81	1979-80
Argentina	8.4	7.8	China	88.0
Australia	15.5	16.0	U.S.A.	22.6
Canada	15.0	17.7	USSR†	109.2
East Europe	25.0	27.7	Other	238.1
West Europe	60.3	55.5		231.7
India	31.0	35.0		
U.S.A.	63.3	58.3		
USSR†	103.0	90.1		
Other	111.8	111.2		
TOTAL	443.2	419.4	TOTAL	437.9

	COARSE GRAINS			
	1980-81	1979-80		
Argentina	17.1	10.9	China	82.5
Australia	6.4	6.1	U.S.A.	148.9
Brazil	19.5	20.1	USSR†	107.6
Canada	18.9	18.6	Other	399.0
East Europe	61.4	63.5		396.9
West Europe	92.1	90.6		
South Africa	10.2	11.3		
Thailand	3.6	3.5		
U.S.A.	197.1	234.5		
USSR†	86.0	80.0		
Other	197.3	188.7		
TOTAL	720.9	777.8	TOTAL	738.0

* As on August 13, 1980. U.S. data for consumption of wheat, barley, oats and rye adjusted to reflect June-May year. † USSR production and consumption of wheat and coarse grains on bunker weight basis.

Source: U.S. Department of Agriculture

MEN AND MATTERS

Planner plans strategic return

"I went too far, too fast," says the now-top-modest Michael Allen, former vice-president and arch-planner of General Electric, attempting to explain his decision last year to climb down from the corporate heights and establish his own business management consultancy in Stamford, New Jersey.

Now, with his former employer and a clutch of pedigree U.S. industry names on his list of clients, the 41-year-old Briton is hawking his notions and reputation about the old country in the hope that his first overseas branch, in London, will get away to a brisk start from its official opening next month.

Already boasting a handful of UK bookings—two companies have retained him specifically to help them penetrate the U.S. market with food and consumer electricals—he bases his sales pitch on the latest buzz words in industrial argot: "strategic planning." Planners corporate and financial, he claims, have no place in the forefront of British management. "Strategy is the box of the eighties—a time when growth is static and when the only businesses able to expand are those which plan aggressively to increase their market shares. Too many, he says, are retrenching, 'battering down the hatches and consuming cash'."

Complaining of "half-hearted" attempts by British companies to make progress in the U.S., he cites EMI's unhappy experiences with the body scanner (he, of course, worked for GE in the thick of it), and he is personally afflicted by what he terms the "criminal negligence" which has left his neighbourhood with only one accredited agent to look after his Jaguar.

Travel weary, dyspeptic and hoarse after a rapid round of lunches, dinners and interviews with some 40 senior British executives, he tells me the image of management consultancy has been somewhat tar-



"Comrade Gierlek should take care... any more sackings and he'll have the Poliburo striking for better job security."

nished in Britain by companies offering mainly patten and attractive packaging.

But he was comforted that two-thirds of his contacts had asked to hear more from this pensive young man whose experience in business management extends from many top of the U.S. tree to the very roots of British industrial life. From his early days with McKinsey he recalls many tortured hours pondering the cumbersome strategies which governed the timing, length and organisation of the GPO's tea breaks.

Backfire

Quick to learn from the jingoistic tactics of certain British companies—barring foreign vehicles from their car parks—South Africa's biggest car manufacturer has issued the inevitable riposte which will do nothing for UK exports.

Drivers delivering supplies to the Sigma Motor Corp assembly plant outside Pretoria are being banded a *billet dooz* which tells them that from the end of the year "only Sigma vehicles will be permitted to proceed beyond

all entrance gates where there are security checks."

Managing director Frank Butler, with an eye to further improving sales of his Mazda and Mitsubishi trucks and Peugeot, Citroën and Mazda cars, explains: "We are big customers for our suppliers, and they ought to be supporting us." With 40 delivery vehicles calling at the factory daily, he counts on augmenting his company's 17 per cent share of the local market.

Lorries over three tons will, however, be exempt from the ban for the time being. The concession, stresses Butler, owes nothing to generosity. Sales of Mitsubishi trucks, he tells my man of the spot, have been so high recently that there is a long delay on deliveries. But when the bottleneck clears Sigma suppliers would be well advised to trade in their BLs and other "foreign" transporters, and beg or borrow one with a Japanese name.

Small change

There has, I hear, been some messy rewiring work carried out in the management circuits of battery-maker Berec. And while the direction has yet to shed any light on the toings-and-froings, I can report that the former managing director of Berec International and president of Berec Inc U.S., Charles Adams, is now beginning a new career after his disputatious disconnection earlier this year.

"Trading in anything and everything, mainly with Africa," the 54-year-old Adams is still plainly cross that his resignation has passed with nary a mention from the group—not any compensation.

"I was there for 28 years," he complains, "and only 18 months ago I was sent to collect a Queen's Award for them."

Earlier this year there was a reorganisation, and I came off very badly. They offered to give me the same salary for taking on about a fifth of my previous responsibilities." His former employers, on the

other hand, still hold to their view that there was no need to trumpet the shufflings in their grandiose titles and subsidiaries. "Berec International," sniffs a senior officer, "is a paperwork company." And Berec Inc? "Has a turnover of 3p."

Lunch box

Although I still do not believe all the stories about the new uses for the furnishings removed in Lloyd's of London's refurbishments (would anyone seriously use a wooden lavatory seat as a picture frame?) I am happy to report that other items of underwriting memorabilia are being put to reputable use.

After less than a week in the window of the Peter Jones department store in Sloane Street, one of the old underwriters' boxes was sold at the weekend, complete with benches and brass number to begin a new career as a six-seater bijou dining suite. Seasoned as it is with many years' blood, sweat and tears, my deudrophilous friends in the lumber business tell me it could be guaranteed wholly gravy-proof, and, for this quality alone, was a snip at £550.

Clean cut

For frankness above and beyond the call of duty, this week's Straight Talkers award goes to the Belgian insurance company Prévoyance Sociale, whose directors declare in this year's English report: "The PS Group is constituted of six corporations... pursuing a common aim: to work in respect of the one and same ideal and to repel any spirit of filthy lucre."

Getting on

A "This is the age of the train" poster at Paddington has been embellished with anonymous notation "104."

Observer

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FINANCIAL TIMES SURVEY

Tuesday August 26 1980

AEROSPACE

The world's aerospace industries go to next week's Farnborough international air show with full civil and military order books, confident that the long-term outlook is brighter than the current business recession in the U.S. and Western Europe suggests.

Aircraft builders ride out troubles

By Michael Donne

Aerospace Correspondent

THE EFFECT of the current business recession on the Western world's aerospace industries has so far been minimal, and they are confident that they can ride it out because of the long-term nature of aircraft and aero-engine design, development and production programmes.

Where the recession has been felt most is in the airline industry, with revenues severely hit by slackening traffic growth—even declining traffic in some cases—and soaring costs. This has slowed the placing of orders for new aircraft by some airlines, especially in the U.S. But the impact so far has been much less severe throughout the rest of the world, and especially in the many developing countries which are expanding their civil aviation infrastructures rapidly.

Even those airlines which have deferred re-equipment decisions because of financial difficulties, stemming from the recession, are nevertheless

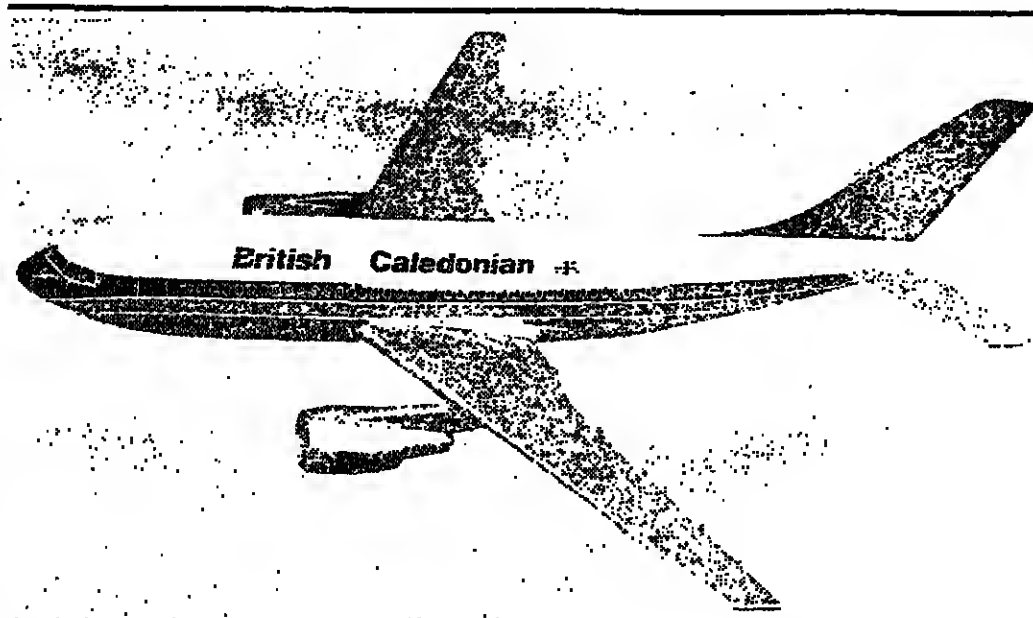
expected to buy sooner or later. This is because their existing fleets are ageing and are becoming increasingly fuel-inefficient in an era of soaring fuel costs, as well as unacceptably noisy in an increasingly environmentally sensitive age.

Nevertheless, there is no doubt that the economic difficulties of many airlines in the Western world are acute, again especially in the U.S., where operating profits for 1979 collectively fell from the 1978 level of \$1.4bn to \$200m, the lowest annual level on record, with a further fall forecast for 1980.

There have been some gloomy predictions of bankruptcies or mergers in the U.S. airline industry, but so far the airlines have been able to struggle through the summer. To Western Europe, airline revenues have also come under considerable pressure from soaring fuel costs (British Airways is a prime example). Fuel now averages about 90 cents a U.S. gallon, with further price rises forecast over the year ahead and an eventual price of about \$2.80-\$3.00 a gallon generally expected before the end of this decade.

To add to the airlines' problems, consumerist pressures for cheaper fares have also been developing rapidly, again especially in Western Europe. The problem of equating these demands with rising costs not only of fuel but of other items such as landing fees, navigation charges, labour and re-equipment bills is giving many airline executives a miserable summer.

Most civil aircraft manufacturers, however, remain confident that the current economic



problems are cyclical, and that by 1981-82, it is hoped, an improvement will be seen. Some foresee the possibility of a flood of pent-up orders from airlines seeking to recover ground lost over the preceding two years, and to secure good positions in the delivery queues that are likely to lengthen during the mid to late 1980s.

Overall, the impression is that by that time, air traffic will be growing again, albeit at a slower rate than the air transport industry has been accustomed to in the past.

But this still means a substantial increase every year in the number of scheduled passengers, and the 1979 total of about 747m worldwide is likely to go well above the 1bn-a-year

level before the end of the decade.

So far only Boeing among the major manufacturers has announced a cut-back in production, because of the effect of the recession. It is only a comparatively small reduction, from 322 jets planned for next year to 283, mainly involving Jumbo jet output, which will be reduced from seven to five a month.

Opposite trend

For all the other airframe and engine manufacturers, the trend is the other way, with some even expanding production to meet the heavy contractual commitments for the new-generation jets. Even Boeing

itself is pressing ahead rapidly with its new 767 semi-wide-bodied jet, due to fly later next year, and its narrow-bodied 757, due to fly in early 1982.

McDonnell Douglas is also now well down the road towards a formal launching decision (perhaps later this year or early in 1981) on its new Advanced Technology Medium Range (ATMR) 178-seat short to medium range transport, now known as the DC-XX, to compete with the 737 and ensure that Boeing does not get the market all its own way.

In Western Europe, the international Airbus Industrie group plans to raise output of its A-300 250-seater and A-310 200-seater Airbus progress-

The European Airbus programme represents the biggest single civil aviation manufacturing venture on this side of the Atlantic, embracing such companies as British Aerospace, Aerospatiale of France, Deutsche Airbus of West Germany which in turn includes Messerschmitt-Bölkow-Blohm and VFW, CASA of Spain and Fokker of Holland. With a total of well over 400 aircraft ordered of both the existing 250-seat A-300 and the smaller 200-seat A-310 (pictured left, which is now under development), the Airbus has become a major rival in the U.S. manufacturers for the world's wide-bodied airliner markets. Further developments of the Airbus are under study by Airbus Industrie, and are expected in the announced soon.

of about three aircraft a month to ten a month by 1985.

This in turn means that British Aerospace, which builds the wings for those aircraft, must substantially raise its own output. The UK group is scheduled to deliver 35 wingsets for the A-300 this year, 43 wingsets for the A-300s and A-310s next year, and 80 A-300 and 11 A-310 wingsets in 1982, rising further thereafter, especially as A-310 output expands.

Airbus Industrie must also take a decision soon on new airliners. It must decide whether or not to develop the improved A-300 Series 600 airliner. Whether to build a stretched A-300 to seat up to 350 to compete more strongly with the

U.S. Lockheed TriStar and McDonnell Douglas DC-10; and whether to build a series of smaller 130-160 seater airliners, the "Single Aisle" or "SA" series, that would compete with the 757, the ATMR and perhaps also with the McDonnell Douglas DC-9 Super 80 which has just entered service, while Boeing is also planning another rival in the new Series 300 version of the 737 short-range jet.

In many countries too—the UK, U.S., Canada, Brazil and Sweden—a new generation of smaller airliners for commuter or "bus-stop" operations is blossoming, including the 80-100 seat four-engined British Aerospace 146, the new 36-seat twin-engined Short Brothers 360, the de Havilland Canada Dash 8 32-36 seat twin-engined feederliner, and the new Saab-Fairchild 34-seat commuter airliner.

The aero-engine manufacturers world-wide are also busy, reflecting the demand from the airframe builders for their products. Rolls-Royce is fully committed with RB-211s in various versions of the Boeing 737 Jumbo jet and the Lockheed TriStar, and also for the new Boeing 757, and has to double its production of the engine in 1980, and again in 1981. At the same time, it is pressing ahead with a new engine, jointly with Japanese companies, the RJ-500 to meet the requirements of new short-haul airliner designs for the mid to late 1980s.

Probably the only significant area of aircraft manufacture that has experienced a setback as a result of the recession has been the general aviation sector, building light aircraft

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for personal and private use, and light transports for business executives and companies.

In the U.S. (the biggest source of such aircraft in the world) deliveries in the first seven months were down from 10,109 aircraft last year to 7,070 this year—although it is significant that this fall was concentrated in single-engined and multi-engined piston types. Turbo-prop deliveries actually rose by 18 per cent, to 446 aircraft, while jet deliveries were up by 13.2 per cent to 180 aircraft, reflecting the continued strong underlying demand for business and corporate aircraft, and the benefits in fuel economy that gas-turbine aircraft can

CONTINUED ON NEXT PAGE

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Helicopters

The successful association with Aerospatiale of France in the production of Lynx, Gazelle and Puma has led to orders of nearly 2,000 helicopters. This partnership continues.

An Anglo-Italian company has been formed with Agusta to develop the EH.101, a new helicopter to replace the Sea King worldwide. Westland WG.30, civil and military transport helicopter based on Lynx technology, is in production.

Hovercraft

British Hovercraft Corporation is a Westland company setting new standards of speed, comfort and passenger appeal with Super 4. In service with British Rail Seaford, Super 4 hovercraft can carry up to 60 cars and 416 passengers across the Channel in half an hour at speeds of up to 65 knots. In 1980 one in three passengers and cars will cross the short sea routes to France by British Hovercraft. Over 60 British Hovercraft have been delivered worldwide.

Normalair-Garrett

Normalair-Garrett in the UK, Australia and Singapore, is a rapidly expanding company in the Westland group supplying mechanical, hydraulic, pneumatic and electronic control systems for Aerospace and defence programmes in Europe and the USA.

Normalair-Garrett supplies life support equipment and environmental control systems for the Tomcat, Hawk, Harrier, McDonnell Douglas AV8B as well as the British Aerospace BAe 146 feeder liner. The advanced digital maintenance recorder for the U.S. F-18 Hornet is in production.

Westland Technologies

Westland Technologies consolidates the international marketing and product development activities of six specialist manufacturing companies in Europe with business ranging from metal fabrications, flexible rubber fuel tanks for helicopters, aircraft and fighting vehicles, to liquid crystal displays.

Westland Aircraft Limited England

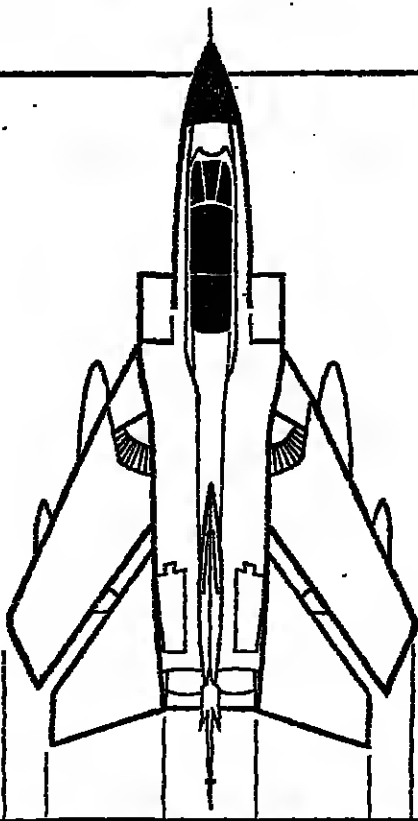


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UK industry at its busiest for years

THE UK aerospace industry is now busier than for many years past, with a wide range of civil and military programmes on hand that are stretching its capacities and resources and seem likely to keep it busy for several years ahead.

The biggest element in the industry is the State-owned British Aerospace, which in 1979 earned profits of £90m, on total sales of over £1bn, of which exports accounted for £576m. At the end of 1979 the outstanding order book of the British Aerospace Group amounted to £3.3bn, of which exports accounted for no less than £2.2bn.

A substantial proportion of this order book is in turn accounted for by civil aircraft, which now occupy an increasing volume of total British Aerospace activity. Two major aircraft programmes are under way—the building of wings for the European A-300 250-seat and A-310 200-seat short-to-medium range Airbus, and the manufacture in the UK of the BAe 146 “baby airbus” of 70 to 100 seats for short-range duties.

Total long-term investment in these two programmes will exceed £500m. For 1980 British Aerospace has set aside £39m for launching costs on new civil programmes, while an overall capital investment budget for 1980 of more than £80m has been authorised by the BAe Board.

On the 146 programme the first order has been received from the Argentine airline, LAPA, for two Series 100 146s seating up to 88 passengers, and one Series 200 aircraft seating up to 104 passengers. Options for a further three Series 200 aircraft have been received.

The 146 is a four-engine feeder-liner-type design, intended to bring air services to small communities which have not had it before. Thus it can be described as a “baby airbus” in the most correct sense, for its role is to fly short distances over difficult terrain, using the most elementary airfields and support services.

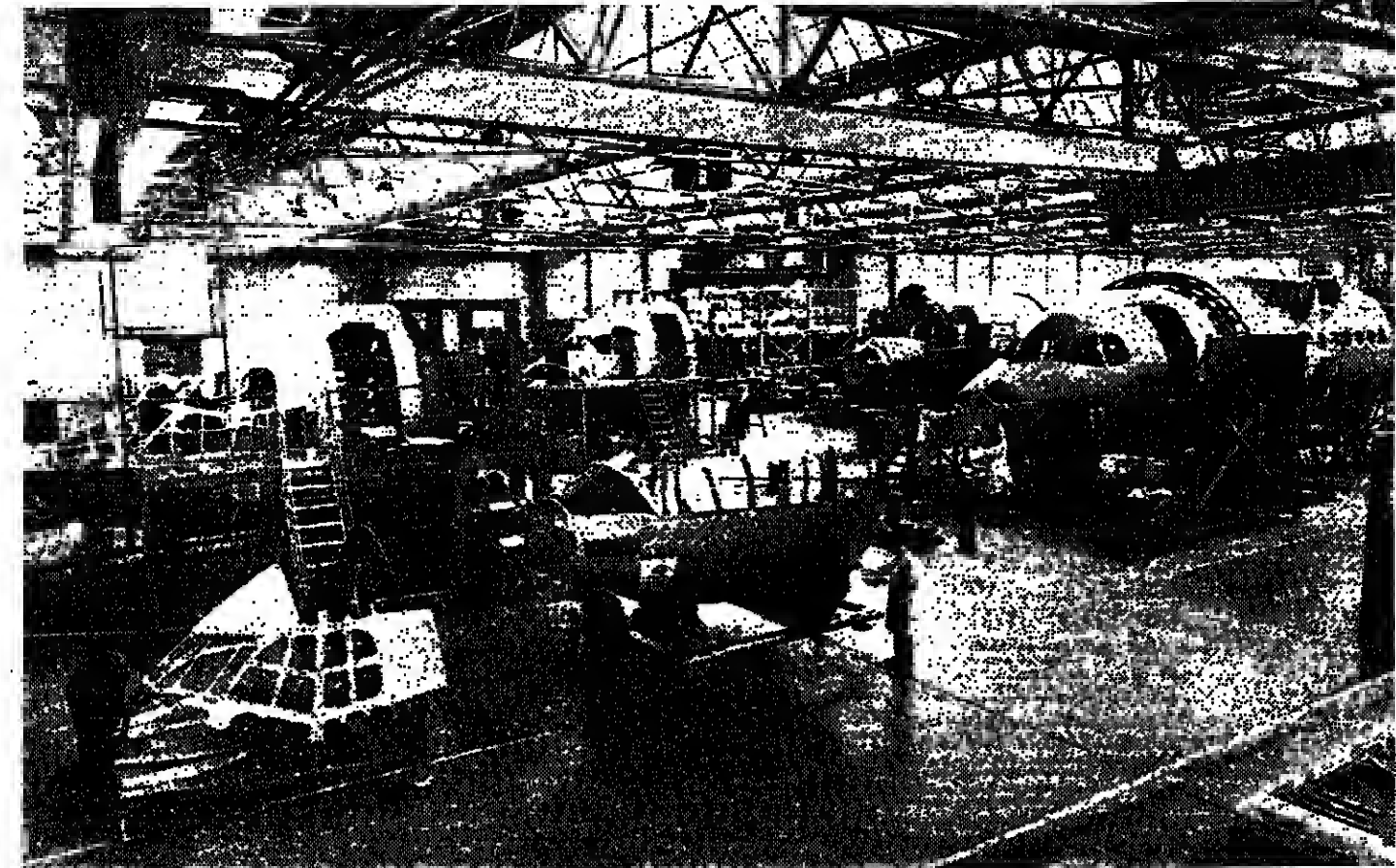
Encouraging

So far, in its marketing campaign, BAe salesmen have visited 180 airlines world-wide, and have reported a “highly encouraging” response. Further orders are likely to be announced before the end of this year.

The first 146 is to be rolled out of its Hatfield, Hertfordshire, assembly line in March 1981, with the first flight in May, with production building up to have six aircraft flying by the end of next year. Currently work is in progress on 20 aircraft, and 25 sets of engines have been ordered from Avco Lycoming of the U.S.

On the Airbus programme seven major factories in the British Aerospace group are involved in the design and manufacture of wings for both the A-300 and A-310 aircraft. On the A-300, delivery of the 134th set of wings was made recently, and additional jigs are being installed at Chester to allow for increased production.

For the smaller A-310 aircraft, further assembly jigs are being installed at Chester, and the first A-310 wings are due for delivery in late 1981, with a first A-310 flight set for the spring of 1982.



The assembly line of the British Aerospace 146 feeder and short-haul jet airliner at Hatfield, Hertfordshire. Roll-out of the first production aircraft is scheduled for March next year

Total orders for all versions of the Airbus stand at over 415 aircraft, and Airbus Industrie is planning to raise production from the present three aircraft a month to 10 a month by 1982, which in turn will require British Aerospace to expand its wing production by a corresponding amount.

As outlined elsewhere in this survey, Airbus Industrie is now studying the possibilities of developing further types of Airbus, including the new Series 600 version, as well as a stretched A-300 design, seating 350, and possibly also a new short-range “Single Aisle” series of 132-162 seater aircraft to compete with the U.S. Boeing 737 and McDonnell Douglas Advanced Technology Medium Range airliners. If such aircraft are undertaken it seems likely that British Aerospace will be deeply involved, either on wing production, or on other parts of the aircraft, or both.

On its other civil programmes British Aerospace is committed for several years ahead on the BAe 125 executive jet aircraft, of which sales to date stand at over 500, worth over £400m in exports alone at today's prices. Production is now running at three aircraft a month from the Chester assembly line, and work is under way on new developments of the aircraft.

The Jetstream 31 aircraft is a development of the original Handley Page Jetstream airliner, which British Aerospace believes has world-wide applications in the buoyant civil “commuter” airline and corporate transport markets. Fitted with new U.S. Garrett turbo-prop engines, advanced technology propellers and new electrical air-conditioning and cockpit systems, the aircraft has aroused considerable interest world-wide. British Aerospace is confident of a long production programme.

with an initial order from the RAF now in negotiation.

The other major civil aircraft now under way at British Aerospace is the 748 twin-engine feeder-liner, the most successful UK airliner since the Viscount, having been in continuous production for over 20 years with sales of over 350 aircraft to date, worth around £400m in foreign currency.

There is clear evidence of a sustained increase in demand for turbo-props in the 40/50-seat category, especially in the U.S., where as a result of deregulation there are now some 370 operators who can use aircraft of the size of the 748. These operators collectively are expected to need between 300 and 1,000 aircraft over the next ten years, while demand also remains high in other parts of the world.

Difficult

As a result, production of the 748 will continue for years to come. The aircraft is being improved progressively, and the possibility of a re-engineered version, using the General Electric CT-7 or T-64 engines in place of the Rolls-Royce Dart, has been considered. The Dart, however, is a difficult engine to replace, itself being progressively improved with substantial life left in it.

The military aircraft activities of British Aerospace are dealt with elsewhere in this survey. But the other major sector of the group, the Dynamics Group, is just as flourishing as the Aircraft Group. Dynamics has about 17,000 employees, and in 1979 had a turnover of close to £350m, of which a substantial proportion was in exports.

The Group has two main interests: the design, development and manufacture of tactical guided weapons systems, and the management of space engineering projects, including

the design and manufacture of space satellites, equipment and electronic systems.

The Group is involved in the development, production and support of more than 25 missile projects, and as such is one of the largest guided weapon design and manufacturing organisations in the Western world.

Among the major programmes of the Army Weapons Division at Stevenage are the development of the Swingfire long-range anti-tank missile (with sales of over £150m to date); the Rapier low-level anti-aircraft missile (with sales so far worth over £700m); and the complementary Tracked Rapier (mounted on an amphibious tracked vehicle); the Milan anti-tank weapon (being built under licence for the British Army); and gyroscopes, radomes and microwave components in reinforced plastics.

The Air Weapons Division at Hatfield is primarily engaged on the medium-range air-to-air missile, Sky Flash; the Sea Eagle air-launched anti-ship missile; and the Sea Skua, a helicopter-launched anti-ship missile.

The Bristol Division, which concentrates on naval weapons, is involved on Sea Wolf, an anti-missile missile; and Sea Dart, a multi-role anti-aircraft and anti-ship missile.

The Space and Communications Division is Britain's leading space engineering contractor, and the largest organisation of its type in Europe. It is involved in the design and construction of communications satellites, scientific satellites and equipment, solar arrays and the Skylark sounding rocket.

Following the signing of a Memorandum of Understanding by the British, French and West German Governments, the Euromissile Dynamics Group (EMDG) was formed in December, 1979, by British Aerospace, Aerospatiale of France

and Messerschmitt-Bölkow-Blohm of West Germany, to design and build new guided weapons systems on a European basis. The initial project for the group is to develop a third-generation medium- and long-range anti-tank guided weapons. Later, EMDG will be responsible for other joint weapons programmes agreed by the three Governments.

At the same time the same three companies, through a jointly owned company, Anti-Ship Euromissile (ASEM), are already working together on the requirements for a future anti-ship missile. It is intended to incorporate ASEM into EMDG as soon as is practicable.

The Government is planning eventually to carry out a partial denationalisation of the State-owned aircraft manufacturer, by selling off a substantial minority of the shares to the private investor. So far, however, the Government has given no indication as to the precise extent of any such sale of shares, or when it is likely to take place.

The prospect of such partial denationalisation does not appear to be worrying the top management of British Aerospace too much, however, partly because the group is currently heavily committed on a wide range of programmes and is highly profitable, and partly also because it already works in an intensely competitive international environment.

Virtually all of the top management of the group have worked in the competitive arena of international aerospace for years, before the creation of BAe by the nationalisation of British Aircraft Corporation, Hawker Siddeley Aviation and Hawker Siddeley Dynamics. The prospect of a partial return to private ownership, therefore, is

in no way daunting. Short Brothers, of Belfast, the other State-owned aircraft company, is also fully engaged in manufacture of aircraft, missiles and “aerostuctures,” the name given to parts for aircraft and other related activities.

In the latter field the company manufactures pods for the Rolls-Royce RB-211 engines for the Lockheed TriStar Boeing 747 Jumbo jet and the new Boeing 787, and pods for over 500 RB-211s of various versions have been delivered. It is also making pods for the Avco Lycoming ALF-502H engines for the new BAe 146 feeder-liner. Airframe component work includes multi-million pound contracts for main landing gear doors for the 747, a range of flight and structural components for the TriStar and inner wing for the 737, four-hundred ship-sets of which were ordered by Boeing last September, in what for Short Brothers was the biggest single order in its history.

Missiles
Missile systems currently in production include Blowpipe, a supersonic shoulder-launched weapon designed primarily for the defence of land forces against low-level air strikes; the SeaCat anti-ship guided weapon; and its land-based derivative, TigerCat.

But Short Brothers is also now active on a range of three small transport aircraft—the Skyvan cargo aircraft, the 30-seat 330 “commuter liner,” and its recently-launched bigger version, the Series 360 36-seat airliner, on which £15m is to be spent on development, with a first flight scheduled for next year and entry into service in 1982.

Short Brothers sees a potential world demand for some 1,000 short-haul aircraft in the 20-40 seat bracket during the current decade, with the majority of the market being in the U.S., where the “deregulation” policy of 1978 has helped to stimulate demand for increased “commuter” or local airline services.

The success of the 30-seat, 330 aircraft, of which over 70 worth more than £75m have already been ordered or optioned by 19 airlines (more than half of them U.S. operators), indicates that the wide-body, high-capacity concept epitomised in the 330 and 360 series is, ideally, suited to this developing market, and the company believes that with the additional introduction of the 360 it will sell between 275 and 550 aircraft in the overall size category. Production of the 360 model will be commencing at maximum rate by 1983, ensuring continuity of employment for the 3,000 people engaged on aircraft production in the company.

Short Brothers is one of the biggest employers in Northern Ireland, with about 6,700 on the payroll at present, rising to about 7,000 over the next year as the series 360 production builds up. Last year, the company's exports reached a record figure of over £45m, accounting for more than two-thirds of the 1979 turnover, and turnover in the current year is expected to exceed £100m.

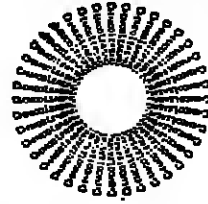
Michael Doyle

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CONTINUED FROM PAGE ONE

bring. The U.S. General Aviation Manufacturers Association remains confident of a swift upturn in deliveries as soon as the economy itself improves in the U.S.

In other areas of aerospace activity, despite the recession, business continues at a high level, reflecting the very long-term nature of the aerospace business.

Military aircraft demand is expected to remain buoyant through the 1980s. Despite pressures in some quarters for disarmament, the fact remains that increasing emphasis is being placed in many countries, especially in the Third World, for the development of air power, with particularly strong demand for light tactical combat aircraft.

Overall demand for military aircraft of all kinds through the coming decade is expected to be not less than 5,000 aircraft, worth an estimated \$50bn, including spares and support equipment.

Guided weapons business is also very strong, and is expected to remain so through the rest of this century. One estimate is that the value of such business could amount to as much as \$45bn throughout the Western world up to the end of this century, involving perhaps as many as 800,000 missiles of all kinds, including a massive 500,000 anti-tank missiles worth over £12bn.

Thus the combined total volume of business for military aircraft and weapons through to the end of this century is not likely to be less than around £90-£100bn, and may well amount to considerably more.

New helicopter

Major new aircraft development and production programmes now under way include the European Tornado multi-role combat aircraft, which covers 809 aircraft for the UK, West Germany and Italy at an estimated cost of well over £8bn. New military programmes under consideration include the possibility of a European Combat Aircraft (ECA), which is being studied by the UK, West Germany and France; a new helicopter for anti-submarine warfare now being studied by the UK and Italy, and several major new missile ventures, including the Advanced Short-Range Air-to-Air Missile (ASRAAM), and Advanced Medium-Range Air-to-Air Missile (AMRAAM) jointly by the UK, U.S. and West Germany.

On the other side of the

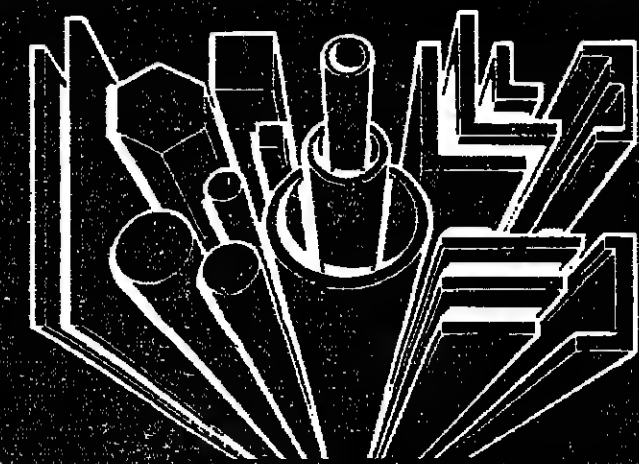
Atlantic, demand continues steadily for combat aircraft of various kinds, and new programmes are being studied by the U.S. Air Force (for both an Enhanced Tactical Fighter and a new trainer aircraft to replace the T-37), while the U.S. Navy is studying plans for a new trainer, and the U.S. Marine Corps is still strongly interested in the Advanced Harrier, the AV-8B.

In all these ventures, international collaboration is a significant element. On both the U.S. Air Force and Navy trainer programmes, many international companies are teaming up with U.S. companies in order to win a share of the eventual business which could be substantial—over 700 aircraft for the U.S. Air Force and perhaps over 1,000 aircraft for the U.S. Navy.

Aerospace, therefore, has no need to worry unduly about the effects of the current recession, provided it is as cyclical and short-lived as many in the industry believe it will be. The long-term nature of civil and military programmes, taking several years to mature, is such that they will be able to bridge the worst economic effects of the recession. Moreover, the financial, technological and sociological necessity for most major airlines to re-equip by the mid to late 1980s will also result in a continued volume of business, notwithstanding the immediately gloomy traffic and revenue statistics emerging from the air transport industry.

If this year's Farnborough show demonstrates anything at all, it is that the world aerospace industry is not only already highly active, but has many new opportunities in both the civil and military fields to look forward to in the years ahead.

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AEROSPACE III

Military demand stays buoyant

DEMAND FOR military aircraft and guided weapons during the 1980s is expected to remain high. Although specific forecasts are difficult to come by because of the sensitive nature of the market, it is generally accepted that upwards of 5,000 new combat aircraft of all kinds are likely to be built throughout the Western world by 1990, worth in excess of \$50bn, including spares and support costs through the lives of the aircraft in operational service.

This estimate is based on the fact that, despite the emphasis placed in some countries of the West on disarmament, the NATO countries alone are pledged to increase their arms spending by 3 per cent a year in real terms in the years immediately ahead — a figure that may well be increased if international tensions remain high or worsen.

At the same time many developing nations throughout the Third World are also building up their armed forces, with considerable emphasis being placed upon combat aircraft, especially light tactical combat aircraft which are cheaper to buy than bigger, more complex types such as the European Tornado or the U.S. McDonnell Douglas F-15 or General Dynamics F-16, the Grumman F-14 Tomcat or the McDonnell Douglas/Northrop F-18 Hornet.

Also supporting this expectation of a continued high level of military aircraft development is the fact that in many countries, many existing aircraft types are ageing, and will need to be replaced by the middle to late 1980s.

There are more than 5,000 Phantoms and over 1,000 Starfighters in service, for example, along with more than 400 Jaguar jet strike-trainer aircraft, which by the 1990s will need to be replaced. Even allowing for a replacement rate of less than one for one (dictated by the rising cost of modern military aircraft, and the increasing sophistication of their weapons systems) it seems likely that the forecast of over 5,000 new combat aircraft of all kinds over the 1980s could prove extremely conservative.

The view held by most major military aircraft manufacturers is that the bulk of these new aircraft are likely to be in the smaller, less expensive light tactical combat aircraft categories — aircraft, for example, of about the size of today's British Aerospace Hawk or the Franco-

German Alpha-Jet, or in the larger ground-attack category, currently met by such aircraft as the Harrier vertical take-off fighter, or the Northrop F-5, largely because these aircraft are cheaper to buy, and because the requirement for new combat aircraft will be coming from countries seeking the maximum number of aircraft for the least possible cost. But at the same time there is bound to be a continued demand for larger, more sophisticated aircraft, to fill the strike, air superiority, and multi-role tasks.

Among major new competitions for advanced military aircraft for the late 1980s and beyond is the U.S. Navy's hunt for a new fixed-wing trainer, the VTX-TS competition, for which upwards of 1,000 aircraft eventually may be required. Several major international companies have teamed up with U.S. companies to submit designs for this competition, with British Aerospace of the UK offering the Hawk in conjunction with McDonnell Douglas of the U.S., and Dassault/Breguet-Dornier of France and West Germany joining with Lockheed to offer the Alpha Jet.

314 ordered

The biggest individual military aircraft programme now under way in Western Europe is the Tornado multi-role combat aircraft, in which over 70,000 workers in three countries — the UK, West Germany and Italy — in more than 500 companies are building 300 aircraft for the RAF, the Luftwaffe, the German Navy and the Italian air force.

So far, 314 aircraft out of the eventually planned 809 have been ordered (in addition to 16 prototypes and pre-series production aircraft), and a contract for a further batch of 163 production aircraft has been recommended by the Chiefs of Staff and is expected to be placed soon, to maintain the tempo of production during the early to mid-1980s. Output is now at 9½ aircraft a month. Already, the first deliveries of the aircraft have been made to the three-nation Tornado Training Establishment at RAF Cottesmore, Lincolnshire, where pilots and navigators from the three countries will convert on to the aircraft.

The Tornado is a swing-wing (variable-geometry), twin-engine military aircraft that will be capable of flying at more

than twice the speed of sound (Mach 2.2 or 1,300 mph) at great heights and also a supersonic speeds of low levels. The aircraft is intended to fulfil a number of major roles, which includes:

Battlefield Interdiction — the support of ground forces in the forward battle zone, requiring large weapons payloads and excellent manoeuvrability;

Interdiction/counter air strike — destroying the enemy's ground installations, supply depots, airfields and communications;

Naval strike — delivering a wide variety of weapons in all weathers against ships and coastal installations;

Air Superiority — denying the freedom of the air to the enemy and giving protection to friendly ground forces;

Interception/air defence — long patrols far out over the Atlantic to destroy incoming enemy bombers at high altitude, while long-range reconnaissance at all heights is also essential to the planning of ground and air operations in war-time;

Training — a training version of the aircraft is being built. Of the 809 aircraft involved it is intended that 165 will be the special Air Defence Variant (ADV), which will go solely to the RAF for the interception/air defence role, for which Britain has been given the responsibility by NATO. All the rest of the Tornado aircraft will be of the basic Interdiction Strike (IDS) version, to fulfil all the other roles mentioned.

In addition to its 165 ADV aircraft, the RAF will get 220 of the IDS version, while the West German Luftwaffe and Marineflieger (German Navy Aviation) will get 324 IDS aircraft, and the Aeronautica Militare Italiana will get 100 IDS aircraft.

With an average price of about \$10m for an IDS Tornado, and rather more for the highly specialised ADV, the overall cost of the programme is now likely to be over \$10bn if spares and support costs are included, along with research and development, making it without doubt the highest single military aircraft venture undertaken in Western Europe.

The Tornado programme is the responsibility of Panavia, a three-nation company specially set up to run the venture, and comprising British Aerospace in the UK, Messerschmitt-Bölkow-Blohm of West Germany and Aeritalia of Italy. The RB-199 engines for the aircraft are the

responsibility of another three-nation company, Turbo-Union, which comprises Rolls-Royce of the UK, Motoren-und-Turbinen Union of West Germany and Fiat Aviazione of Italy.

While substantial effort is now being put into the Tornado programme, another major new military aircraft venture is being studied in Western Europe — a plan for a "European Tactical Combat Aircraft," or ECA, to replace the Jaguar jet strike aircraft in the RAF, the Phantoms in the Luftwaffe, and Mirage combat aircraft in the French Air Force.

Common design

For some time the aerospace industries of those three countries have been studying, at their governments' request, the possibility of evolving a common design to meet the varying requirements of the three countries. Earlier this summer the industries submitted a report to their governments indicating that they had reached broad agreement on the feasibility of such a project, and they urged their governments to authorise the programme to go ahead. Since then studies have continued, and a decision from the three governments on the next phase of the programme — detailed project definition studies — is now awaited.

It is clear, however, that such a programme will be expensive. In view of inflation in all three countries involved, the eventual swiftness of such an aircraft is unlikely to be much less than \$5m, so that if the full total of about 700 aircraft as currently envisaged is built, the overall cost, including research and development, is not likely to be much less than \$3bn, and could be considerably more. There have already been expressions of concern by the West German Government at the possible high cost of such a venture, and it is always possible that either of the other two partners may also decide it is too expensive.

But no one country can do it alone because of cost. There is only one alternative, therefore, to developing such an aircraft on an international collaborative basis in Europe (there being no doubt at all in the minds of the air staffs of the three countries as to the need for such an aircraft) and that is to buy a ready-made tactical fighter from the U.S.

This is regarded as an un-

acceptable solution by the aerospace industries of the three countries, which would see in such a decision the virtual abandonment by their Governments of the whole basis of advanced military aircraft manufacture on this side of the Atlantic. Thus it seems likely that before the ECA venture finally gets rolling, there will be some substantial political manoeuvring in its favour by the air forces and especially also the aerospace industries of the three countries. Much more is likely to be heard of the ECA in the months immediately ahead.

One of the problems confronting the planners in trying to reach a common ECA is that the various Air Staff requirements in the three countries are markedly different — AST-403 in the UK, TKF 80 in Western Germany and ACT-82 in France.

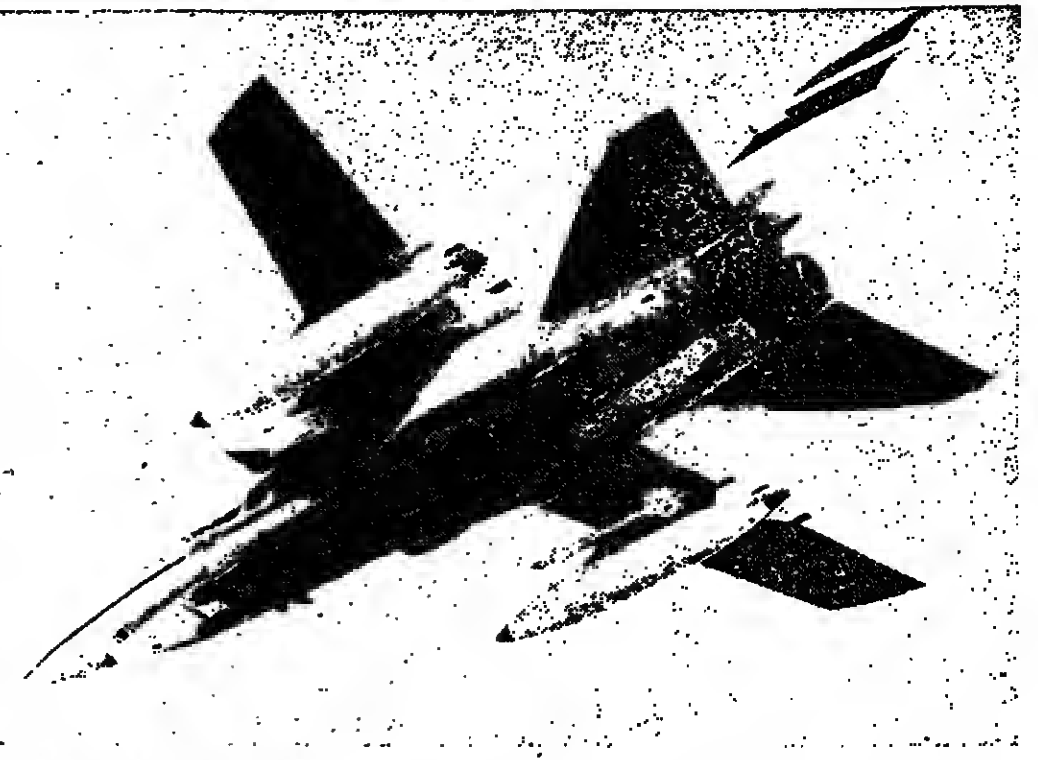
This was reflected in the different designs for an ECA appearing at the recent Hannover Air Show, and it seems likely that there will have to be some considerable further international discussions before a common programme evolves.

In addition to the ECA, the UK itself has to take a decision soon on another major new aircraft venture — the development of the British Aerospace Harrier Mark 5, for service from the mid-1980s onwards.

The prime need of the RAF in this area is for an aircraft capable of carrying a bigger payload over longer distances, with a better air-to-air combat capability in addition. Analysis of the design studies already produced by British Aerospace have shown that the Mark 5 can meet all the requirements specified by the RAF as necessary for a battlefield support aircraft in service from the mid-1980s to beyond the end of this century.

There has been speculation that the Harrier Mark 5 and the AV-8B Advanced Harrier designed by McDonnell Douglas of the U.S. (in conjunction with British Aerospace) to meet a requirement for the U.S. Marine Corps are in direct competition, with an "either/or" situation developing. This is demonstrably not the case, since each aircraft has been designed for different roles and missiles.

The AV-8B for the U.S. Marine Corps is an efficient aerial "bomb-truck" that meets the needs laid down by the Marine Corps, with not only an



The Tornado Air Defence Variant fitted with four Sky Flash missiles under the fuselage and two self-defence Sidewinders and long range tanks on the wing pylons

excellent bombload and radius of action, but also capable of satisfying what can be described as the austere basing and minimal servicing requirements which the U.S. Marines find essential in their amphibious assault roles.

The Mark 5 Harrier, on the other hand, responds to a much more sophisticated requirement for a low-level fighter/attack aircraft capable of surviving in the hostile North-West European NATO environment.

As a result of recent action in the U.S. Congress, funding is now firm for four full-scale development AV-8B aircraft, the first of which will fly at the end of 1981. Providing funding is continued by the U.S. Government, 12 pilot-production aircraft flying from 1983 will lead to the first squadron of production AV-8Bs entering service with the U.S. Marine Corps in 1985. Some 340 aircraft could be built for the Marines.

British Aerospace is a subcontractor to McDonnell Douglas and will supply about 30 per cent of the work in the AV-8B airframes. Rolls-Royce will supply over two-thirds of the work done on the Pegasus engines for the aircraft. The value of this work (including contributions by other UK aerospace contractors, such as Dowty, Plessey, Fairey, Dunlop, etc.) up to 1990, could amount

to no less than \$600m of which about a third would be the share of British Aerospace itself.

Looking much further ahead, although the latest generation of fighters such as the McDonnell Douglas F-15 Eagle and General Dynamics F-16 is now moving into service in increasing numbers, the major U.S. military aircraft manufacturers are already looking to the 1990s, when it is recognised that a new generation of advanced combat aircraft may be needed, to meet whatever new developments the Soviet Union will have by then undertaken.

By then the F-15 itself will be more than 20 years old in terms of design concept, and although its weapons and other systems can be progressively up-dated to keep abreast of enemy-combat aircraft development, by the middle to late 1990s an entirely new design concept for this and other combat aircraft is likely to be needed.

To study such concepts the U.S. Air Force and the Government-sponsored National Aeronautics and Space Administration have already financed an unmanned combat aircraft research vehicle, the Rockwell International "Himat" — highly manoeuvrable advanced technology aircraft — which incorporates a substantial number of

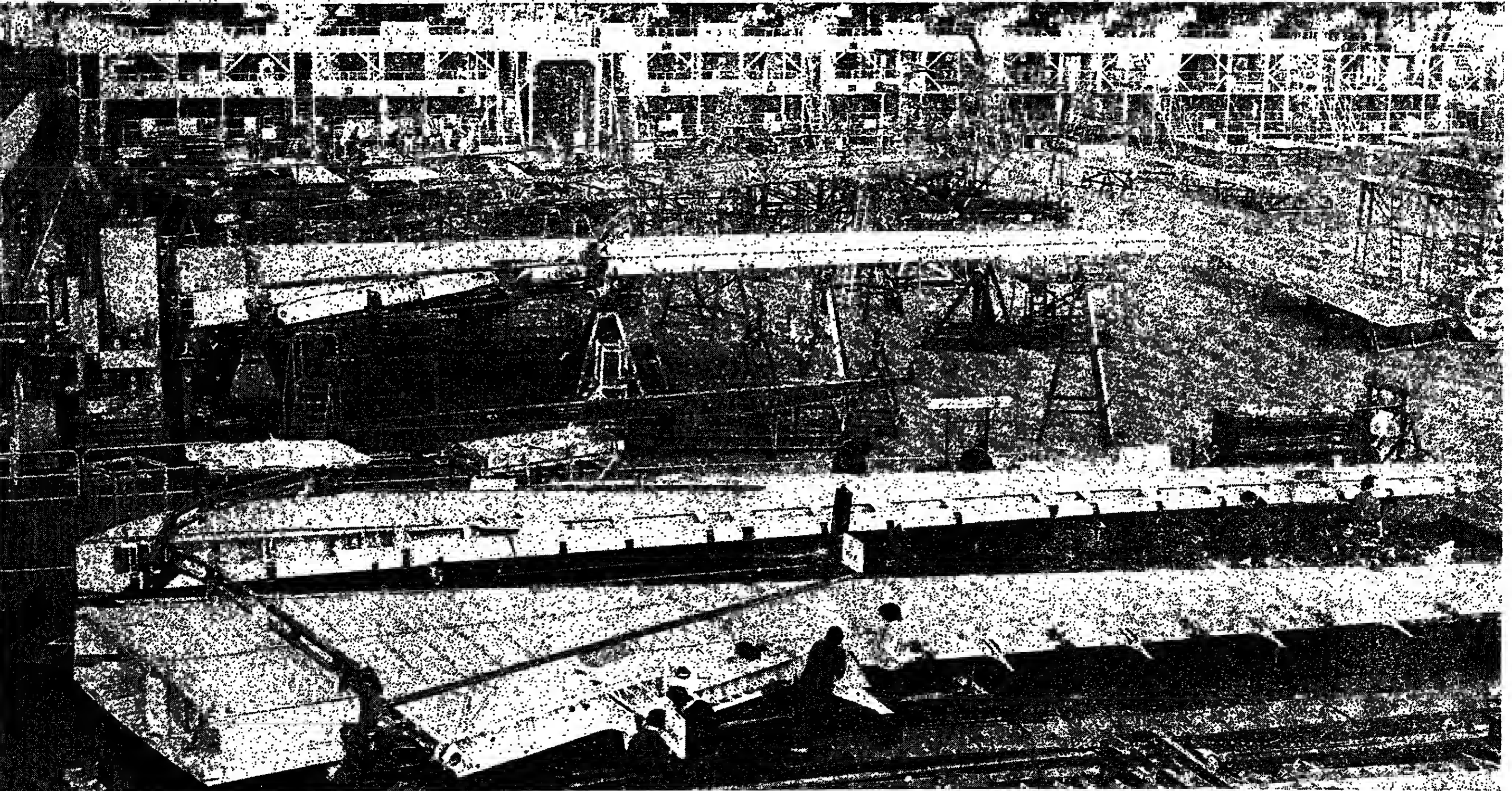
new design features of the kind likely to be incorporated in any new combat aircraft.

Making considerable use of advanced composite materials, Himat, which is launched from a B-52 "mother-ship" for a series of research flights, is a supersonic vehicle capable of sharp twists and turns in flight, pushing the frontiers of fighter design ever further forward. At present, two Himat aircraft are flying, but more advanced models may be developed during the 1980s.

U.S. interest in future combat aircraft design does not stop with airframes, however. Recently, the biggest U.S. aero-engine builder, Pratt and Whitney, revealed that it had begun the development of a new jet engine for the next generation of fighter aircraft. Called the PW-1120, the engine would be based on the existing F-100 engine used in the F-15 and F-16 aircraft. It will be a turbo-jet, of around 20,000 lb thrust, for both single-engine or twin-engine fighters.

The company is using its own funds to finance the three-year development programme to take the engine up to flight test stage, and production of fully qualified engines will begin in 1985.

M.D.



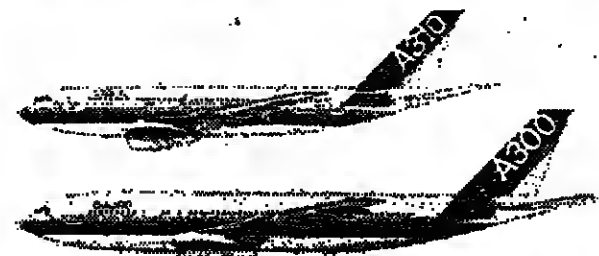
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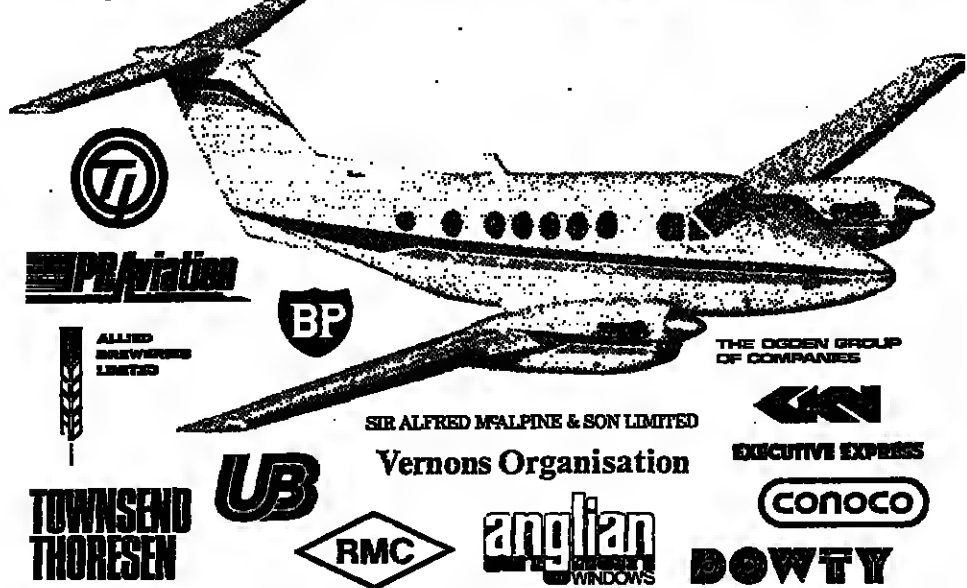
technology of the A300 and A310 amply meet the demands of the new environment.

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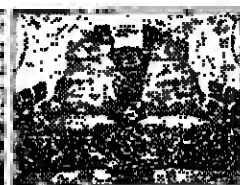
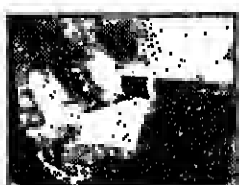


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Sales of non-military helicopters expected to grow dramatically

DEMAND FOR helicopters is expected to continue to grow rapidly during the 1980s, as a result not only of continued sustained demand for military aircraft of various kinds but also as a result of new developments on the civil side of the helicopter manufacturing industry which are resulting in aircraft specifically designed for a wide range of non-military duties.

All analysts in the U.S. and Europe agree that by the 1990s the civil market will have overtaken the military in terms of numbers of aircraft bought per year.

Total free-world production of helicopters is now running at about 3,000 aircraft a year, with a civil and military fleet of about 20,000 aircraft, of which about half are in the U.S. and a quarter in Western Europe. Of this 20,000, about 60 per cent is military, but this proportion is changing as civil aircraft procurement expands.

The general conclusion among all helicopter manufacturers is that the business outlook is good, provided manufacturing costs can be kept down.

Hitherto, helicopters for civil use have been derived directly from military models. As a result, ruggedness and reliability in service have been more desirable design factors than economy of operation, with little regard being paid to such matters as comfort for passengers and even styling. Inevitably, the civil models which have been derived from the military models have not been either the most economic or the most elegant flying machines, and sales have thus remained comparatively low.

But as a result of a deter-

mined attempt by the major helicopter manufacturers to meet the rising demand for good quality, economical civil aircraft, in which some major new technological breakthroughs have been achieved, the opportunities for civil helicopter sales have expanded dramatically.

Among these new technological breakthroughs have been improved lifting capability stemming in turn from improvements in power-plants and rotor-blade design; greater use of high-performance composite materials, leading to greater

weight-lifting capabilities; and an extensive simplification of components, leading to cheaper running costs and easier maintenance.

At the same time, the range of civil uses for helicopters is itself expanding. Whereas in the past the helicopter has been used largely where its convenience has been paramount—for example, in search and rescue where its ability to hover has been the vital factor, or in other emergency roles where its ability to land and take off in small spaces has been essential—now the emphasis is changing.

Small cabin helicopters are challenging the small fixed-wing cabin aircraft in economic operations over short distances of up to 200 miles or so, while also enjoying the helicopter's unique ability of dispensing with runways or the other facilities of sophisticated airfields. Increasingly, businessmen are turning to helicopters as "airborne cars," able to go virtually anywhere at will over short distances.

The off-shore oil industry, which has been the cornerstone of the civil helicopter market in recent years, is expected to grow even more rapidly with the advent of new cabin machines such as the seven-tonne-seat U.S. Bell 222 and the 12-passenger Sikorsky Spirit.

At the other end of the scale, where a "heavy-lift" vehicle is required, the new commercial version of the Boeing Chinook heavy helicopter is likely to revolutionise the transport of men and materials from shore bases to off-shore rigs and platforms. For the commercial Chinook can carry up to 44 passengers over distances of 650 nautical miles non-stop, and a bigger version carrying 66 passengers is under consideration.

New uses

There is also increasing use of helicopters by non-military government bodies, such as the police, medical services, Customs and Excise, and coastguards, while new uses in general commercial roles continue to be found—in lighthouse relief work, for example, or in lifting heavy objects (such as water tanks or elevator machinery) to the tops of multi-storey buildings, as well as in civil engineering, surveying, forestry work or in aerial agriculture.

In the U.S., Bell and Sikorsky are currently the leading manufacturers of civil helicopters, with the Bell 222 and the Sikorsky Spirit both selling well.

In Western Europe Agusta has also been a dominant company in the civil helicopter field, in particular with its SA-365 Dauphin 2, a twin-engine 14-seat aircraft; and the six-seat single-engine EuroHeli and Astar. In Italy, Agusta has developed its A-109A twin-engine, seven-passenger, general-purpose helicopter. In Western Germany Messerschmitt-Bölkow-Blohm has developed the BO-105 series of light helicopters, and is now developing in conjunction with Kawasaki of Japan the 8-10-seat multi-purpose BK-117 helicopter.

In the UK, Westland Helicopters has devoted most of its attention in recent years to the development of aircraft for the military market, but is now also turning to the civil market.

The multi-role Lynx helicopter has been particularly successful in dominating the NATO market for frigate-based anti-submarine helicopters. The Army Lynx is in service with the British Army, and strong interest in it has emerged in Belgium, Holland and Germany. But competition in this class of aircraft is fierce, and Westland has yet to achieve the major sales needed to offset the loss of the prospective business from the now-defunct Arah Organisation for Industrialisation (AOI). The company's Sea King anti-submarine warfare aircraft and its Commando tactical transport variant also continue to sell well overseas with a buoyant market expected to be sustained through the 1980s.

The company has now also produced the WG-30 tactical transport helicopter, a twin-engine aircraft designed to carry up to 21 passengers over distances of up to about 300 miles at a speed of about 145 knots. In both civil and military versions, Westland foresees a potential market for the WG-30 of around 400 aircraft through the 1980s.

A "customer mock-up" of the WG-30 in British Airways colours will be seen on the company's stand at the forthcoming Farnborough Air Show.

Throughout Western Europe, much emphasis in recent years has been placed on trying to reach international agreement for development of the next generation of helicopters for military (and possibly also eventually civil) use through the 1980s. A successful international link was arranged years ago between the UK and France to develop the now familiar Gazelle light helicopter, the Puma tactical transport helicopter and the Lynx multi-role aircraft.

Some two years ago, following an agreement in principle between the Defence Ministers of the UK, West Germany, France and Italy on military helicopter collaboration, the European Helicopter Corporation (EHC) was formed. Since then, this body has identified certain areas for future military helicopter development, including a four-tonne anti-tank helicopter; a six-tonne aircraft for tactical air transport; and a ten-tonne aircraft for anti-submarine warfare.

But implementing these ideas on a four-nation basis has proved difficult, and the most recent development has been the formation by the UK and Italy of a separate organisation, by Westland Helicopters and Agusta, called E.H. Industries, on a 50-50 basis.

The aim is to design and develop a common helicopter, known as EH-101, to meet the requirements of the Royal Navy, the Marina Militare Italiana, and military export markets, for a replacement for the Sea King and SH-3D anti-submarine helicopters, and also to meet future civil requirements for an aircraft suitable for off-shore and other operations.

Westland and Agusta estimate the total market for the EH-101 at around 750 aircraft outside the U.S. and Warsaw Pact countries.

There are, as yet, no signs of a parallel operational requirement emerging in West Germany and France, so that the EH-101 is not yet a Pan-European programme. But Agusta of France is understood to be keen to join the venture, and may play a part later in the development of the civil variant.

Three engines

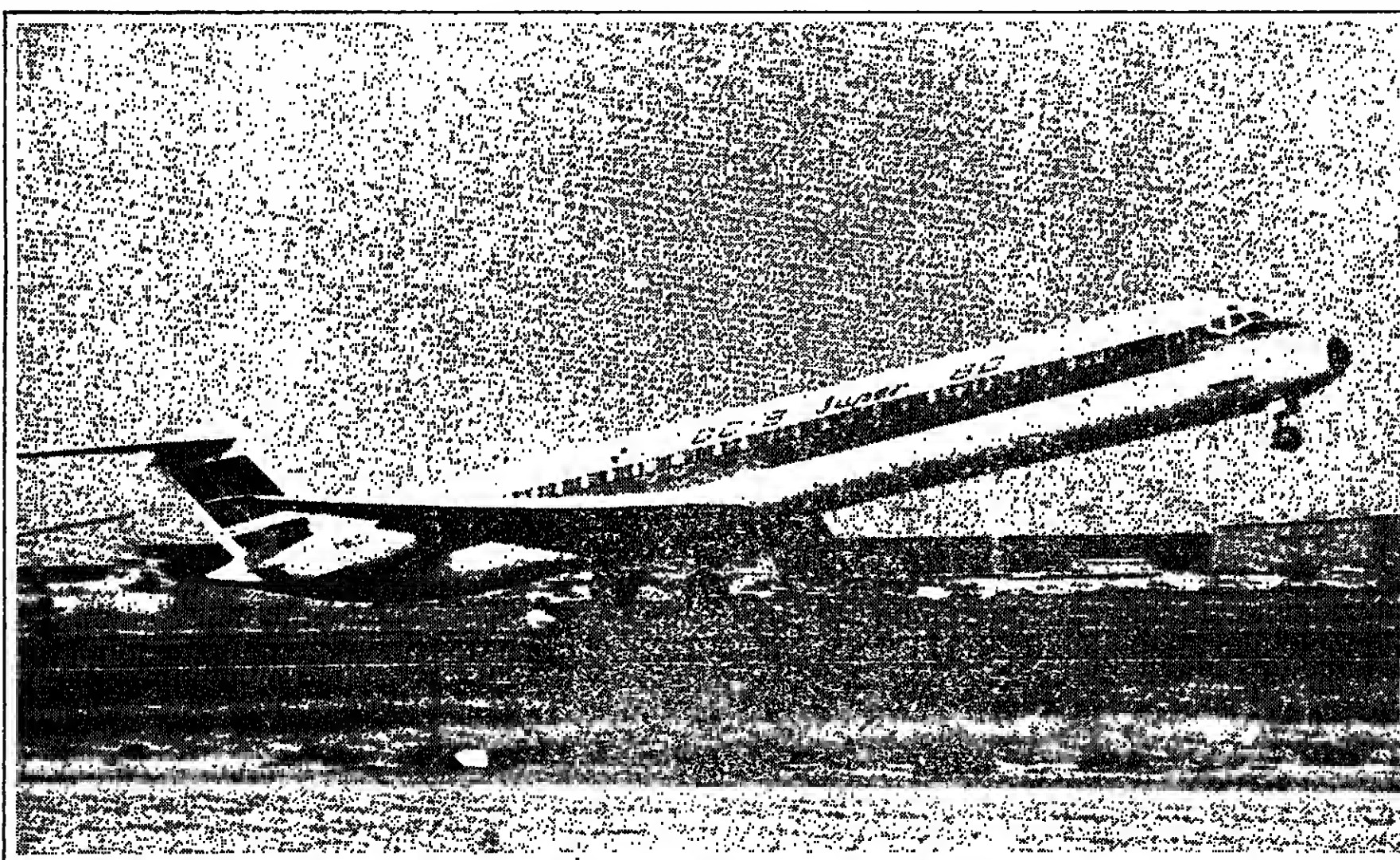
The EH-101 will be a three-engine aircraft, using initially the U.S. General Electric T-700 engines, although different engines may be used in production models—perhaps the Rolls-Royce Turbomeca RTM-321. Although there will be a strong common element in the avionics equipment to be used by both the British and Italian versions of the aircraft, weapons and other equipment "fits" will be different for each country, and each will manage its own systems integration. At Westland, the EH-101 team already involves some 300 design engineers and expenditure is already running at around £20m to £30m a year.

The purpose of E.H. Industries is to receive development, and later also production, contracts from the Joint British-Italian Government agency, and to distribute the work on a 50/50 basis between Westland Helicopters and Agusta. The financing and management are governed by a series of international governmental "Memoranda of Understanding," the second of which is due to be signed soon.

This will establish the joint government procurement agency, and initiate the flow of development funds to the programme.

E.H. Industries is a UK-registered company, with offices in Sloane Street, London. The board comprises Lord Aldington, chairman, and Mr. Basil Blackwell, chief executive of Westland Helicopters, Count Corrado Agusta, president of Agusta, and Dr. P. Fascone, chief executive of the Italian company.

MD.



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With the new McDonnell Douglas DC-9 Super 80, the high-noise area around airports is just one-fifth of what it is with today's comparable aircraft. It's the first big jetliner to meet the new U.S.A. and international noise requirements for the 80s and beyond.

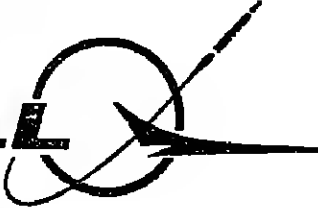
The Super 80 also offers airlines the lowest operating cost per seat mile of any aircraft in its class, plus the lowest fuel consumption per passenger of any commercial jetliner, up to its maximum range. That's 40% better on fuel than today's most widely-flown jetliner. Commonality of maintenance and support systems helps keep costs down, too.

The Super 80's new cockpit boasts the first systematic application of simple, reliable, lightweight and highly accurate digital technology in an airliner. The result: lower cost, more capability, and reduced flight crew workload.

Passengers will appreciate the Super 80's new cabin decor. Accommodating up to 172 passengers, the seats are every bit as wide as those on jumbo jets. We've increased ventilation and decreased cabin noise as well.

The quiet, comfortable, fuel-efficient DC-9 Super 80. It's precisely what airlines need for the 80s and beyond.

DC-9 Super 80
MCDONNELL DOUGLAS



A Royal Navy "Commando" (Sea King Mk 4) helicopter in action demonstrating its ability to transport heavy loads.

Airlines face painful batch of problems

THE WORLD's airlines are now facing an almost unprecedented series of problems that are collectively depressing not only traffic growth but even threaten in many instances the financial viability of some of the major carriers.

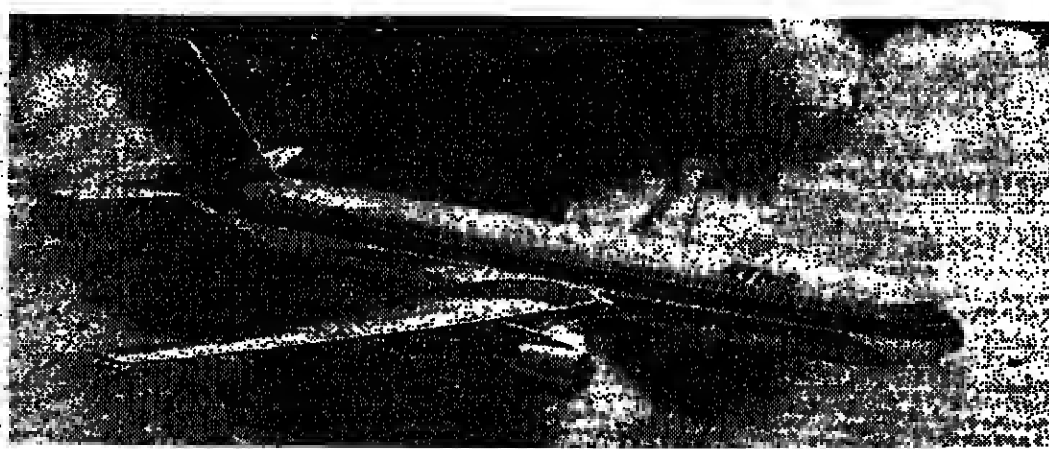
Foremost among these difficulties is the soaring cost of fuel, while its present limited availability in some places and the longer term prospects of even more severe shortages, are also a worry. In addition, inflation is pushing costs in other directions even higher, such as labour, landing fees, en route navigation and other charges. This is generating the inevitable pressures from the airlines for the increase in fares, at a time when many consumer groups are pushing the other way, for reductions in fares, especially in Western Europe and the U.S.

On top of this, the airlines have had to face in the past year, or so, some sharp currency fluctuations, which have severely affected the revenues of some airlines.

As if all this were not enough, the spectre of recession has also emerged in some parts of the world, again especially in the U.S. and Western Europe, although in some parts of the Third World traffic remains buoyant. To cap the airlines' problems, there has been in the past two years the attack on the world airlines' major trade association, the International Air Transport Association (IATA), by the U.S. Civil Aeronautics Board (CAB), seeking to remove that body's immunity from U.S. anti-trust laws, with a further more recent attack on the IATA's travel agency arrangements in the U.S.

According to Mr. Knut Hammarskjöld, director-general of the IATA, "this is a time of brutal financial realities. The world's airlines are being squeezed dry by soaring costs, sky-high interest rates, diminishing yields and nose-diving profits. Many carriers are in the red. What we need today are practical and imaginative approaches to these real-world problems, not idealistic, theoretical and too often politically motivated economic bewhash."

The effects of all these prob-



McDonnell Douglas of the U.S. is now developing a twin-engine short-to-medium range airliner, the Advanced Technology Medium Range transport, now to be known as the DC-XX. A formal launch commitment for the aircraft is expected during the next few months

lems are already being seen in declining traffic. In the U.S. the airlines have been hit harder than elsewhere, with traffic on major domestic routes down by 3 per cent in the first quarter of this year, and a drop of anything between 5 and 10 per cent expected for the year as a whole.

Showing up

Elsewhere in the world the drop has not been so marked, but it has occurred, and it is generally anticipated that for 1980 as a whole world-wide the rate of traffic growth may be cut back to about 3 to 5 per cent, against the 10 per cent expansion of 1979, while in some parts of the world growth may even disappear entirely, with traffic actually declining to levels below that of last year.

The effects on the airlines' finances are also now showing up. According to the International Civil Aviation Organisation (ICAO) the total operating profits of the world's scheduled airlines last year amounted to only \$700m, or 1 per cent of total operating revenues of \$70.5bn.

When it is borne in mind that out of these operating profits must come such items as interest rates on fleet re-equipment programmes, together with taxes to governments, it seems obvious that many of the world's airlines are losing money.

According to the ICAO, in 1978 (the last year for which detailed statistics are available),

about a sixth of all scheduled airlines incurred operating losses, a third reported operating profits of 5 per cent or less, another third had profits between 5 to 10 per cent while another sixth reported operating profits of more than 10 per cent of revenues.

Mr. Hammarskjöld does not mince words about the current situation. "The deteriorating world economic situation will shape the pattern of airline development for the next few years, perhaps even a decade, deregulation or no deregulation." This is a reference to the U.S. decision to try to stimulate airline competition by removing many of the regulatory controls over routes and fares in that country while at the same time so framing its approach to international civil aviation negotiations as to try and impose a measure of deregulation on international air services to and from the U.S.

Mr. Hammarskjöld has attacked this policy vehemently. "I firmly believe that a gradual liberalisation in the regulatory environment, and a reasonable measure of competition, are beneficial to consumers and airlines alike. I believe, however, that policies of instantaneous deregulation and unbridled competition can only result in cut-throat pricing and duplication of services with adverse impacts on airline profitability and fuel utilisation."

"I am concerned that, with escalating operating costs and a worsening general economic

environment, the scope for liberalisation and low fares today is more limited than might have been thought three years ago, when the CAB embarked on the domestic deregulation experiment," says Mr. Hammarskjöld.

In today's economic climate, he believes it is necessary to take things "a step at a time, and adapt the evolution of international air transport intelligently to the cyclical movements of our environment."

He believes that world air transport is subject to a five-year cyclical evolution.

Load factors

"For example, 1970 and 1975 were particularly poor years for airline finances, whereas in 1973 and 1978 airlines enjoyed their best profit performances of the 70s. We are now in 1980 and an international recession is taking off."

He foresees a period in which costs will overtake improvements in performance by the airlines, with lower load factors resulting, followed by sharp cutbacks in service, and severe financial problems world-wide.

"We have a climate in which bankrupt policies can quickly lead to bankrupt airlines. Perhaps the current sombre scenario will prompt in the 80s a re-evaluation of international policies without losing sight of the objective of any efficient airline of serving the public as adequately and cheaply as the

financial environment, largely created by governments, will permit."

The severity of the fuel price increases of recent years can be gauged from the fact that the fuel bills of the airlines of member States of the ICAO—the aviation technical agency of the United Nations—which amounted in 1973-74 to about \$524m (excluding the Soviet Union) are estimated to have reached \$7.4bn in 1979-80, or nearly 14 times as much.

The cost of fuel per U.S. gallon, which amounted to 20.59 cents in 1973-74, had risen by 1979-80 to 83.5 cents, and this figure is expected to go on rising. Forecasts by most airlines and aircraft manufacturers agree that an average price of \$2.80 or more per U.S. gallon world-wide by 1980 is not impossible.

The effect of such rises on the airlines' own costs has been to raise the fuel element of direct operating costs from a level of around 11 per cent a few years ago to more than 25 per cent today, and this proportion is expected to rise further.

The airlines have had little alternative but to seek to pass on these fuel price increases directly to the consumer in the form of higher fares, because they cannot absorb them on top of inflation in other directions—rising labour charges, dearer landing fees, en route navigation charges and other facility costs such as parking fees at airports.

But the airlines have also suffered from a reluctance by governments to allow them to pass fuel prices on to the passengers quickly enough. As a result, there is now a gap between fuel price rises and compensating fare increases which at any one time amounts to more than \$1bn—cash which the airlines are effectively being denied, so that their liquidity is being further unnecessarily squeezed.

To meet this situation, the airlines collectively through their trade association, the IATA, have worked out what they call a "pass through mechanism," a formula whereby they can automatically raise fares by certain amounts when fuel prices rise, without having to keep calling special fares-fixing conferences.

This mechanism will still mean that the airlines must get government approval for any

fare rises they may wish to make, while the formula itself must also be accepted by governments before it can become effective world-wide. So far, over 30 of the 100-plus governments whose airlines are members of the IATA have approved the scheme, so that there is still a long way to go before it can become operational.

But throughout the past few months there has been extensive diplomatic pressure by the airlines and the IATA itself on reluctant governments, and it is hoped that before the end of this year, enough of them will have agreed to enable the formula to become effective.

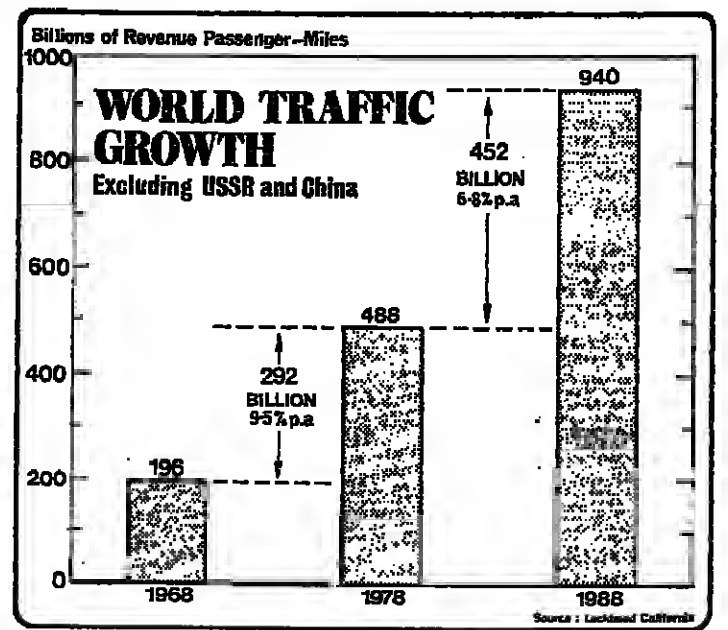
Cumulative

Basically, the formula involves calculating the effect on airlines' operating costs of fuel price rises in three-monthly periods for every route area in the world. If there is less than a 1 per cent rise in their operating costs directly attributable to fuel price rises in any area, no action will be taken, although the 1 per cent will be "rolled over" into the next quarter, and will thus be cumulative. If there is a rise of more than 1 per cent, but less than 3 per cent, an increase in fares of the same amount would be made, covering flights in that area. If the rise in costs is more than 3 per cent but not more than 4 per cent, a flat rise in fares of 3 per cent would occur.

If the rise in costs is above 4 per cent, but below 6 per cent, there would be mail vote of the airlines concerned on a rise in fares of the same amount, with a fares rise of 3 per cent becoming effective in the event of a disagreement among the airlines. If their costs rise by more than 6 per cent directly as a result of fuel price increases, they would hold a special fares meeting to consider what action to take.

The formula may appear to be clumsy, but in the light of the complex nature of the world air transport route structure, the widely different sizes and varying natures of the airlines concerned—well over 100 in all—and the different attitudes of their governments, it is the best the airlines can achieve.

Just how well it will work remains to be seen but at least the airlines feel it is better



FUEL PRICE FORECAST (in current U.S. dollars)

Area	Average price per gallon				
	1979	1980	1983	1985	1990
United States	0.57	0.82	1.50	1.74	2.80
Canada	0.42	0.62	1.35	1.55	2.55
Mexico	0.46	0.72	1.40	1.60	2.70
Caribbean	0.70	1.10	1.65	1.84	2.90
Central/South America	0.69	0.98	1.60	1.78	2.90
Europe/Mid-East/Africa	0.73	1.07	1.65	1.84	2.90
Far East	0.66	1.02	1.60	1.75	2.80
South Pacific	0.66	0.92	1.55	1.75	2.80
Price per barrel					
World	19.20	29.40	46.00	57.00	95.00
United States	16.70	27.80	49.00	60.00	95.00

Source: CAB Data—U.S. Trucks All Services (1979) Data. 1980-85 forecast by Lockheed Marketing.

than nothing in a period of continual rises in fuel costs, and they hope it will do something to cut down the \$1bn loss they are currently consistently incurring.

At the same time, however, the airlines are obliged to continue their fleet replacement programme, and also to buy new jets to meet the longer term improvement in their situation that many believe will come.

The re-equipment tide has slackened in recent months as a result of the airlines' economic problems, but orders are still being placed, especially by airlines in the Third World. This is because many of the existing fleets are ageing, having been in service for upwards of 15 years, and are now becoming fuel-inefficient in today's climate of soaring fuel costs, while at the same time they are becoming unacceptably noisy in an increasingly environ-

mentally-conscious age. The new aircraft, moving in are likely to be up to 30 per cent better in fuel performance than those they replace, with further improvements likely through the 1980s.

For the longer-term, to ease the way for the mass travel and air cargo boom that many in the industry foresee in the middle to late 1980s, the world's airlines are pressing governments for consumer-orientated approaches to existing government procedures that create bottlenecks and hold-ups at airports and along the routes. The airlines want easier customs and immigration formalities, and a more concerted attack on air traffic control problems, including easier over-flying of sensitive areas of the world, so as to speed the flow of passengers and cargo, and also to save fuel.

M.D.

IN AN UNCERTAIN DECADE COSSOR TECHNOLOGY OFFERS CERTAIN ADVANTAGES

As we enter the eighties the Jeremiahs are having a whale of a time. Political, military, economic and environmental prognostications all have one thing in common—pessimism. At the risk of sounding complacent, Cossor Electronics see the future quite differently. We have the technology we have the order book, and we have a range of sophisticated equipment which gives us every reason to face the future with confidence. And that goes for the people that work for us too.

If you doubt us, just look at some of the products we have just introduced, or are about to introduce, to answer the needs of our customers in the defence, aviation and public authority fields.

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We are amongst the world leaders in secondary surveillance radar, the vital tool which gives air traffic controllers information on the height and identity of aircraft. Now we have improved our capability with the introduction of monopulse techniques to overcome many of the problems of signal interference which occur in crowded skies. Already the UK Civil Aviation Authority has ordered 20 monopulse systems from us—and we expect many other authorities in the world to follow their example.



Compass 9000—presenting a clearer, sharper picture

As another step forward in secondary radar technology, we have introduced a software controlled processing and display package to give the operator clearer, more accurate information. Known as the Compass 9000, the system is modular in construction, economical in price, and has already been specified for several major airports in the United Kingdom.

Cossor telemetry—in the know about the flow

Our data processing, communications and software expertise is now being applied to the rapidly growing field of computerised telemetry. Particularly suitable for gas and water distribution, our systems will monitor, detect and display information instantaneously, allowing users to take maximum use of their resources and to take swift

remedial action on faults. Already seven public utilities have ordered our systems, and we think that they are the first of many.

A major role in Fibre-Optics

Recognised as a major communications breakthrough, fibre optic technology still requires a sophisticated fault locating capability to help realise its amazing potential. Amongst our many activities in the field, we are producing three advanced instruments that will pinpoint optical fibre cable faults instantly. Available in the near future, these Cossor instruments will make a major contribution in this important field.

Cossor Modems—ready to eliminate extraneous signals

We are playing a role in the resurgence of HF communications with the introduction of two programmable modems—a 'two-tone' with patented filter techniques to maintain correct transmission frequencies, and a 'multi-tone' which can transmit data at the maximum HF speed of 2400 bauds. Both modems will have many civil and military applications.

Celtic—a mobile information centre

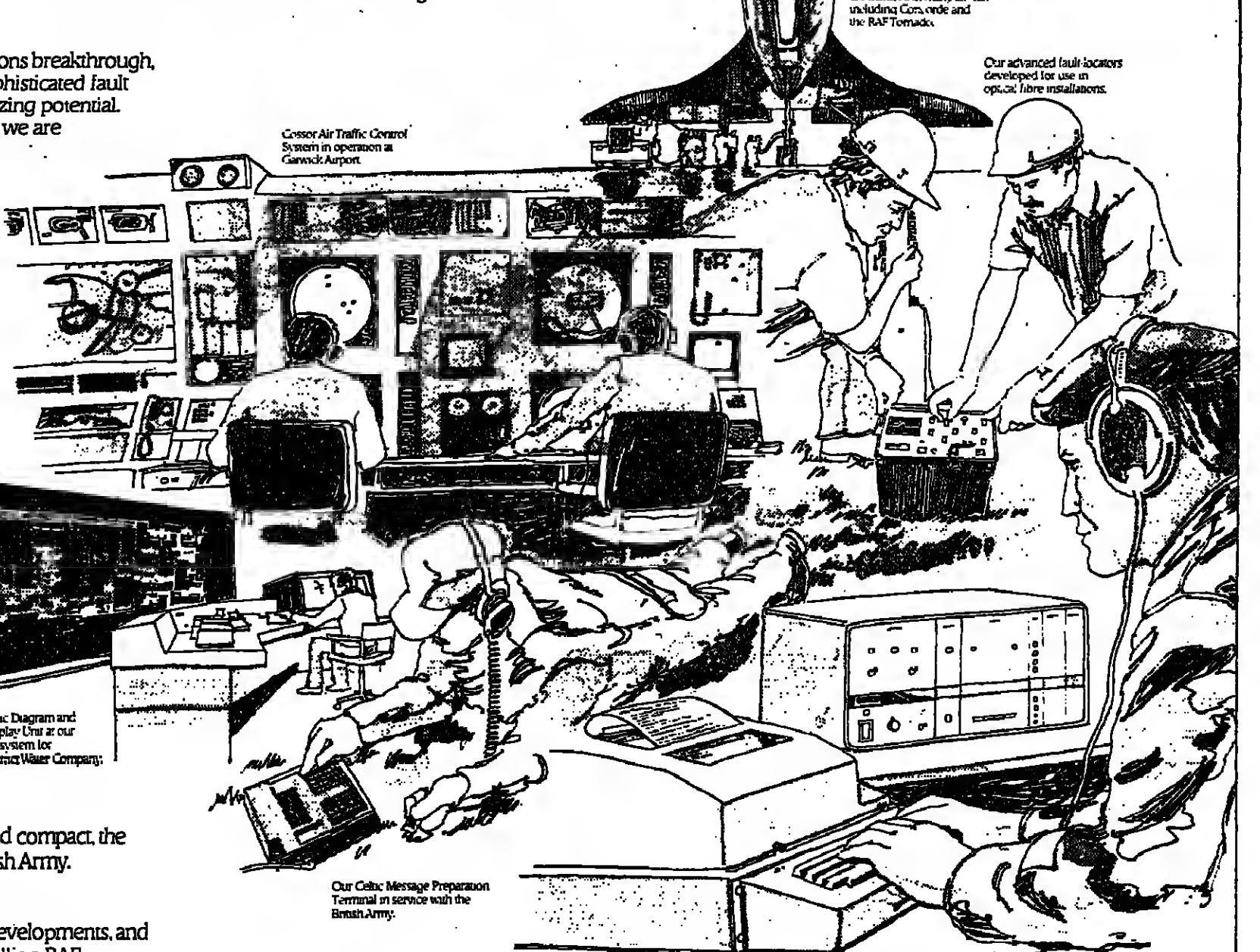
The Celtic is a tactical message terminal, using a Cossor modem. Developed as an aid to security, it can store and edit messages, and then transmit them in a short burst. Rugged and compact, the Celtic has now been ordered by the British Army.

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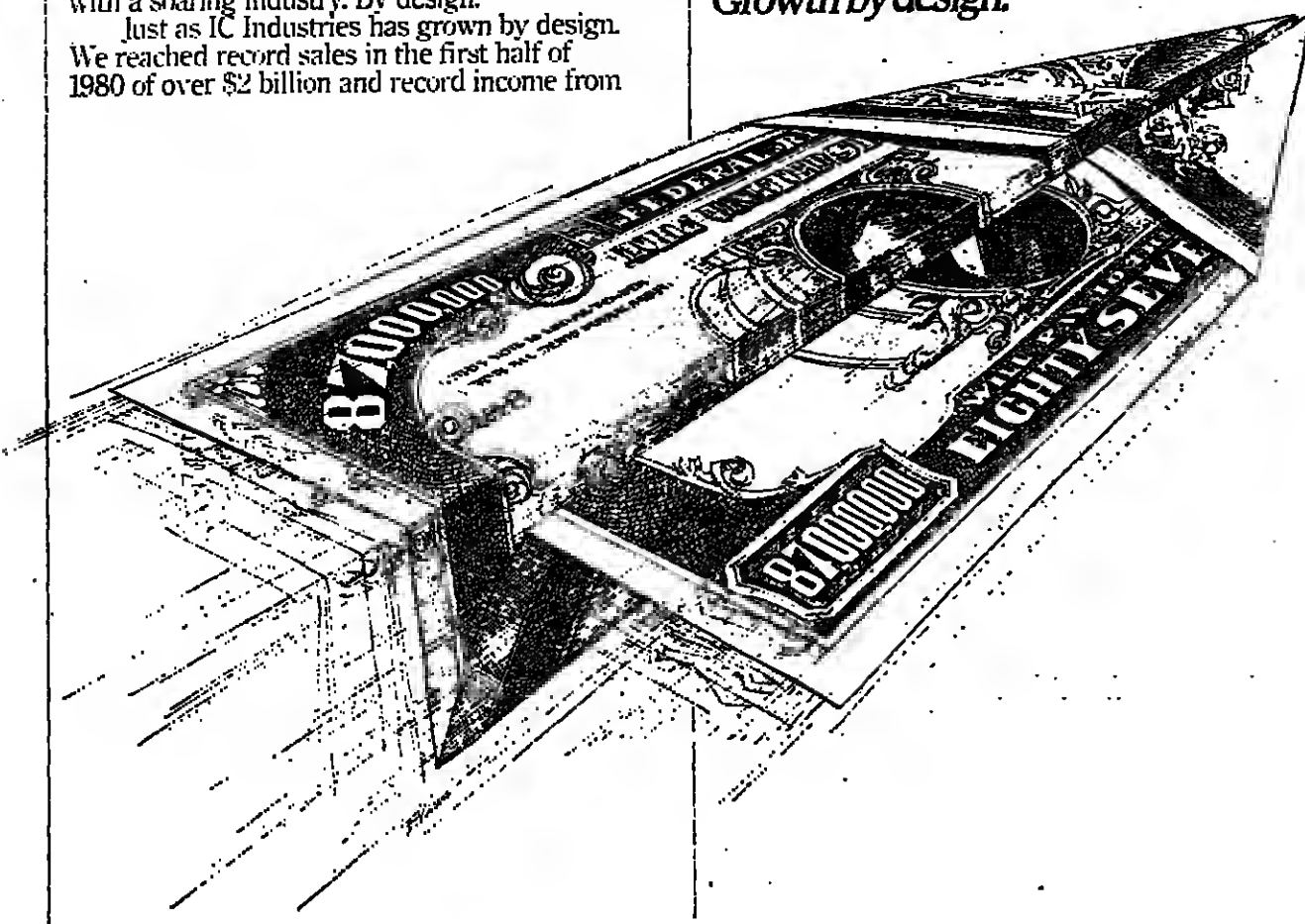
continuing operations of \$45.5 million, 30% over 1979.

Today, Consumer and Commercial Products Groups form our company cornerstones. And we're building on them to reach new growth and profit milestones.

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If you'd like to know more about our growth, contact: Martin Harvey, Abex-Aerospace, Victoria Gardens, Burgess Hill, Sussex RH 15 9ND. Telephone: Burgess Hill 5121

IC Industries
Growth by design.



Airport expansion projects prove confidence in future

THE LARGE-SCALE programme of new airport developments now planned by Western and Third World nations to meet demand for air transport services into the last years of the century is expected to continue unabated throughout the 1980s.

This is despite the recent decline in the recent high growth rates for passenger traffic caused by the growing recession in world trade.

Passenger traffic is now expected to grow at only 5 per cent a year in the immediate future. This compares with the average growth rate of 10 per cent a year experienced in the mid to late 1970s when cheaper fares and rising incomes opened air travel to large numbers of new travellers.

Their confidence stems from the belief that the current downturn in demand for air passenger transport services is temporary.

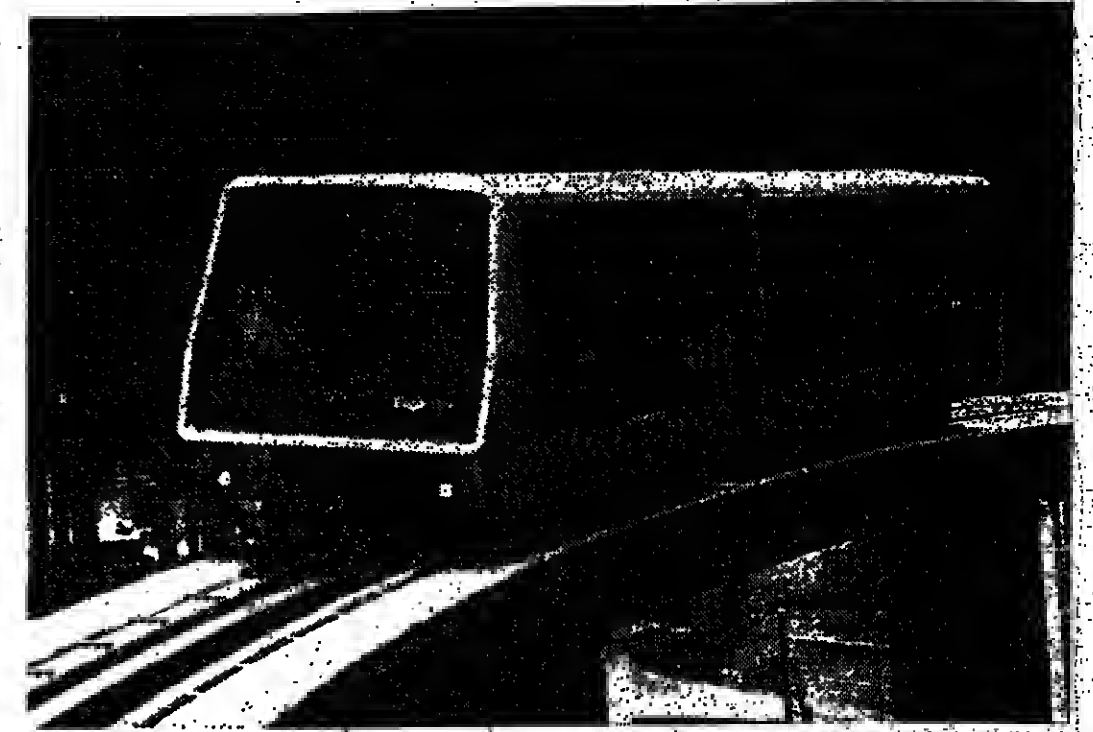
The industry points out that the last substantial fall in demand for air transport, after the Middle East war of October 1973, when oil prices rose dramatically, was very short-lived. Within a year, passenger traffic numbers had resumed their growth rates.

Similarly, after the most recent fall in demand, in 1976 to 1977, demand picked up again, after a year of low growth, and—until this latest downturn—had regained the steady rate of growth recorded in the late 1960s and 1970s.

The result of this confidence among the air transport operators is continued commitment to the most substantial programme of airport and related developments ever seen in the air transport industry.

Plans now underway call for the spending of a world total of up to \$500bn by the early 1990s on new airports, expansion at existing airports and on all the auxiliary equipment essential for the safe and efficient running of an airport in the late 20th century.

More detailed figures—the latest published by the Inter-



The Westinghouse fully-automated light rail system of the type to be installed at London's Gatwick Airport as part of the British Airport Authority's development programme over the next five years. The system will carry passengers from the existing terminal to a new "satellite" building closer to the runway

national Civil Aviation Organisation last year—show the scale of proposed projects.

Civil engineering is the biggest single component in airport construction programmes and is expected to cost airport authorities and governments \$12.5bn at 1979 prices. Further spending is expected by the 1990s. The ICAO expects more than half of this expenditure to be carried out in North America.

Europe is the second greatest area for new airport projects and those aimed at expanding existing facilities. Spending in the region on construction alone is expected to run to more than \$2.5bn over the period to 1988.

Africa is also expected to provide work for airport designers, contractors, and equipment suppliers, with total civil engineering spending likely to exceed \$2bn over the period.

The other substantial area of spending in the airport sector involves air traffic control systems. Total world projects are expected to involve the spending of almost \$12bn on control equipment, with most of it supplied by countries in Europe and North America.

Again, North America dominates the business with plans to spend almost \$6bn of this total on air traffic control equipment.

Europe, where an advanced infrastructure for handling air transport already exists, albeit at the limits of capacity in some cases, including London's Heathrow Airport, is expected to spend more on air traffic control systems than on new civil engineering work for airports.

Nevertheless, airport improvement and expansion schemes, as at Britain's Gatwick and Heathrow airports, continues with no sign of a lull.

Ground handling systems for world airport developments are likely to cost almost \$5bn over the next eight years. North America and Europe dominate the investment in this area of forklift trucks, conveyors, baggage sorting and handling equipment and aircraft towing tractors and passenger buses.

ATC handling sector includes advanced rapid-transit systems, and world airports, including Gatwick, are gradually moving towards this type of semi-fully automated system as an aid to the quick and efficient handling of passengers. The British Airport Authority decided last September to install a Westinghouse rapid transit system at Gatwick to link the existing passenger terminal to a new "satellite" building.

Replacement

This building is designed to replace the north pier at Gatwick and, when completed in 1982, will handle passengers carried by the unnamed, electrically-propelled vehicles from the main terminals. Other developments at Gatwick, now one of the world's fastest-growing airports, include a plan by British Rail to redevelop Victoria Station in London by 1984 to separate air passengers from rail users.

The expected continued rise in the volume of passengers at world airports has led to the large number of schemes now under way—as at Gatwick—to ensure that sufficient capacity is available to handle the aircraft and their loads.

In Britain, airports' policy, at least to 1984, was defined last December when Mr. John Nott, the Trade Secretary responsible for civil aviation matters, announced his plans for meeting the expected shortfall in capacity at London's two main airports—Gatwick and Heathrow.

The current capacity of these two airports, with Stansted, the other major south-east airport controlled by the British Airport Authority, and Luton, controlled by the local authority, is 50m passengers a year. The total number of passengers who used Stansted, Gatwick, Heathrow and Luton last year was almost exactly 40m passengers.

Heathrow is the largest airport and in 1979-80 handled a total of 28.5m passengers with facilities capable of handling 30m passengers. The latest figure represented a rise of 7.4 per cent compared with the previous year.

Domestic traffic accounted for the major part of this increase in volume, and was up by 14 per cent on the previous year, a rise which was countered in part by the 6 per cent decline in traffic to and from the Middle East over the recent period of intense political unrest.

Low fares

The introduction of low fares on routes between London and the U.S. led to a growth of 11 per cent in the volume of traffic in and out of Heathrow on these services. The volume of European traffic to and from Heathrow Airport grew at a more modest 5 per cent increase in passenger volume.

A continuation of growth in passenger volume at even a more modest rate than last year, say at approximately 6 per cent a year into the mid-1980s—would result in Heathrow running out of capacity well before the mid-1990s. Growth, however, is expected to fall to a steady 3 per cent to 4 per cent a year into the late 1980s and 1990s.

The British Airport Authority's plans for a fourth terminal at Heathrow were finally approved by the Government before Christmas. This terminal, which will also be the last permitted at Heathrow, will raise the airport's capacity to 38m passengers a year from April 1985, the earliest possible time for the extra capacity to be available, and three years later than originally planned by the authority.

The delay will result in "severe overloading at Heathrow" before the terminal comes into operation, the authority said last month.

At the other main airports, Gatwick has recently had £100m spent on new facilities, and with passenger volume up by 11 per cent to 8.8m passengers, the airport now claims to be the sixth busiest outside the UK in terms of passenger traffic.

Gatwick now can handle 16m passengers a year through one terminal building and from one runway.

The airports authority has firm plans to build a second terminal raising capacity to 25m passengers a year by the mid-1980s, subject to planning permission. But it has committed itself to handling this volume on the existing single runway, a decision which was sealed in a legal agreement with the local authority which effectively prevents the BAA from building a second operational runway at any time in the next 40 years.

This additional terminal capacity will lift the total capacity of Heathrow and Gatwick airports to 63m passengers a year by the mid-1980s.

But the main element of the Government's airports policy in statement made last December was the decision to allow the small, currently under-used airport at Stansted to expand from its current capacity of 1m passengers a year to 15m by the late 1980s. Only 400,000 passengers used Stansted in 1979/80.

However, Mr. Nott made it clear that the proposed strategy is one which allows this extra capacity to be developed only as demand develops. He said this approach avoided the massive expenditure implications of developing a green field or coastal site.

The current plan is for a new terminal to be built at Stansted to handle the expected increase in traffic flow. This terminal will be fed by the existing runway. However, the Government has given permission for the BAA to define and apply for the "safeguarding" of an extra 2,500 acres of land—enough for a possible second runway and extra terminal space if this is needed in the

1990s and beyond, possibly up to a capacity of 50m passengers a year by the year 2000—the current combined capacity of Heathrow, Gatwick, Luton and Stansted.

With the proposed first new terminal at Stansted, by the late 1990s the three London airports would be able to handle 78m passengers a year or 8m with Luton airport. This compares with the latest forecasts, which take account of the uncertainty about future oil prices and world economic growth, and point to a demand of between 68m and 81m passengers a year, by the late 1990s. At this maximum demand, passenger capacity will match combined capacity in a decade's time.

At the time Britain is formulating its policies to cope with the expected increase in demand for air travel facilities, developments are continuing in Europe, North America and in Third World nations. One of the largest programmes, for meeting this rising demand is now taking shape at the Charles de Gaulle Airport, Paris.

The airport is noted for its doughnut-shaped terminal. This is aesthetically pleasing but, apparently has not worked as a functional building. Problems of congestion associated with the detailed design of the building have led to a completely different approach in the design of the airport's second terminal.

Instead of a circular terminal, the Aéroport de Paris planners decided on three more conventional terminal buildings, with the first expected to open next year, and the others by 1985 if they are needed. They will, in total, increase the capacity of the airport by 15m passengers at a total cost, with associated aircraft apron facilities and roads, of almost £160m.

Another area of rapid airport development is the Middle East. A new international airport is to become operational soon at Jeddah, Saudi Arabia, and two other large airports are under construction at Riyadh and at Dhahran.

Further plans

Plans for a new airport also exist in Hong Kong. It is desperately needed to replace the facilities at Kai Tak, which is expected to reach saturation point by the mid-1980s. Preliminary studies are already being carried out with a view to building a new airport at Chep Lap Kok on Lantau Island west of Kowloon and Hong Kong Island. A final decision on the project is expected to be taken by 1982, so that work on the \$500m airport can proceed the following year.

At Singapore, the first phase of the \$500m new airport at Changi, replacing the existing airport at Paya Lebar, is now under development and is due to become operational next year, with further expansion planned through the 1980s and beyond as demand dictates. This new airport, much of it on reclaimed land, is to be linked to the city by a new express highway. Changi will further enhance Singapore's role as the air transport "hub" of South-East Asia.

In the U.S. one of the most spectacular developments is at Atlanta, Georgia, where the \$750m Hartsfield Atlanta International Airport is to open in mid-September.

The terminal is claimed to be the largest in the world and will be capable of handling 50m passengers a year, and eventually up to 75m passengers.

Atlanta International is already the second largest airport in the world and last year it handled 43.7m passengers. Only Chicago's O'Hare airport with its throughput last year of 47.8m was bigger in terms of passengers handled. Heathrow has now dropped to fourth place in the world league with a 1979-80 throughput of 28.5m passengers.

Lyntas Melan

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AEROSPACE VII

Labour-saving equipment likely to dominate market

WORLD DEMAND for aerospace equipment and associated systems is expected to call for total civil investment of almost \$60bn between now and the late 1980s.

New updated equipment and systems requiring fewer man-hours to operate and maintain are likely to dominate purchases by aircraft manufacturers, airport authorities and airport ground operations handling companies.

The \$60bn investment figure includes on-board equipment for civil aircraft, air traffic control systems and the whole range of airport and aircraft ground equipment essential to maintain the safety and comfort of passengers and crew and the efficient operation of contemporary air transport systems.

Expenditure on military aircraft equipment is even more substantial but less easy to quantify.

On the civil side, by far the largest sector in the aerospace equipment field is that covering the equipment and spare parts needed for operations on board the aircraft.

A third of cost

This equipment is estimated to account for approximately a third of the total cost of new civil aircraft—more in the case of new military aircraft where the demands of advanced radars, communications equipment, missile controls and airborne electronic counter-measures raise substantially the basic costs of airframe and engine.

Of the total cost of new airline transport aircraft, their maintenance and parts and new general aviation aircraft, maintenance and parts estimated at over \$210bn at last year's prices, according to figures published by the International Civil Aviation Organisation (ICAO), equipment and parts account for \$70bn, or, if updated to current prices, about \$42bn of the total civil aircraft, maintenance and parts spending by the late 1980s.

Other ICAO figures showed that air traffic control equipment and systems are likely to account for over \$7bn over the period up to 1988. Spending on airport ground handling equipment, for the same period, is expected to account for over \$3bn of the total spending on aerospace equipment.

Growth in all these sectors is of course linked with the fortunes of the air transport industry and passenger volume

is expected to grow more slowly—perhaps at half the 10 per cent per annum rate experienced in the mid to late 1970s—that was expected even as recently as last year.

A prolonged downturn in demand for civil air passenger transport services would almost certainly hurt the world's aerospace equipment makers just as much as the airframe and engine manufacturers, perhaps more so. This is a reflection of the growing importance of the equipment sector as a generator of employment and new technology.

Typical of the type of new and advanced equipment now being specified for the latest jet airliners are the digital electronic instruments being designed by the aerospace instrument sector for use in Boeing's new 737 twin-jet passenger airliner which is to join British Airways fleet in 1983.

The instruments are designed for easy reading by flight crews and to be compatible with the new generation of on-board computers.

These lightweight computers, made possible by the advances in miniaturisation associated with recent developments in micro-electronics, have a vital role in helping to provide flight crews with a high degree of "thrust management." This is the current phrase used by aircraft manufacturers to describe the control of aircraft fuel at a time when its cost is putting a severe strain on commercial airline operations.

Related to fuel-efficient operation is the need for accurate guidance of aircraft. The new Boeing 737 will have a guidance system provided by a navigation and aircraft attitude system based on new laser gyroscopes. The digital flight management computer will enable the flight crew to co-ordinate the autopilot and automatic throttle controlling engine fuel consumption, so that climb, cruise and descent can all be carried out at maximum fuel efficiency.

Boeing believes that these developments will help reduce, largely through higher fuel efficiency, the operating costs of the 737 airliner by about 40 per cent compared with the existing airliners it is designed to replace.

The 737 project has provided other work for British aerospace equipment manufacturers, including Dunlop. The company has developed low-weight tyres for the main and

nose wheel landing gear of the aircraft and expects to supply at least 200 sets over the period of the aircraft's development phase.

Dunlop carbon brakes are fitted to all Concorde aircraft and have been specified for the new British Aerospace 146 airliner. The BAe 146 is expected to make its first flight next year and already the first set of wings from Avco Aerostructures in the U.S. has been delivered to the BAe Hatfield factory for joining to the fuselage.

Dunlop has also had success in the military aerospace equipment field. The company's Aviation Division at Coventry has been awarded its first major U.S. contract. The company is to supply the integrated brake systems for the full-scale

development phase of the McDonnell Douglas AV-8B, the latest version of the British Harrier vertical take-off aircraft.

But the design and manufacture of aerospace equipment is not concerned solely with such advanced products.

Airport equipment for ground handling operations provides essential machinery for the efficient day-to-day operations of civil airlines. The \$3bn world market for this type of equipment expected by 1988 has helped provide the impetus for the continued existence and prosperity of the British Airport Equipment Group, the Leeds-based group of UK manufacturers which is to hold its fourth annual conference in London early next month.

The group represents a wide range of companies involved in the specialised design and manufacture of ground support equipment for aircraft handling and servicing.

Underlined

Members make air-conditioning units, tow tugs, air-stairs, air-starters, baggage check-in systems, baggage trailers, vans and tractors, cargo hoists, transporters and catering trucks. More specialised companies make fuel storage and distribution systems, ground power units, hydraulic platforms, toilet trucks, vehicles for washing aircraft, water trucks and complete hangers.

The activities of many of the companies will be underlined at this year's Farnborough Air

Show and Exhibition, with the publication of the first British Airport Equipment Catalogue.

This brings together many of the products of the airport equipment suppliers with the objective of winning a greater share of world airport equipment contracts.

The idea for the catalogue arose out of the "Design and Export" report three years ago produced by the Civil Engineering Economic Development Committee, part of the Government's National Economic Development Office.

The catalogue is also supported by the British Airports Authority, the Civil Aviation Authority and the British Overseas Trade Board, which said it would be a "useful marketing tool."

Up to 500 companies in Britain making airport equipment are potential supporters of the catalogue, which will be distributed world-wide and free-of-charge to people connected with airport decision-making.

Also at the heart of the aerospace equipment business and on display at Farnborough will be Fairley Hydraulics, part of the Fairley Holdings Group of companies, recently the subject of a major change of ownership. Fairley was owned by the Government's National Enterprise Board until earlier this summer when the Board accepted a cash offer of £22m from the Royal Doulton Group for the whole of Fairley's issued share capital.

Fairley Hydraulics plans to

show its wide-ranging and growing activities in aircraft flight control, landing gear, filters and ground support equipment. The company is pre-eminent for its highly specialised design and manufacture of primary flying control actuators for military and civil aircraft. Fairley flight control actuators have been supplied for the Anglo-German-Italian Tornado aircraft.

Hydraulically actuated rudder and spoiler controls from Fairley have also been specified for British Aerospace's 146 feeder airliner.

Continued demand for advanced aerospace equipment for use on aircraft has created a subsidiary market for test equipment worth millions of pounds a year.

Lynton McLain

Intense competition in electronics

ness in tough export markets.

One of the greatest success stories so far has come from Marconi Avionics, the GEC-Marconi Electronics group company based at Rochester, Kent.

The company has supplied more than 1,500 "head-up display" units for the cockpits of the U.S. Navy's A-7E and A-7D Corsair jet fighters since 1968. It also supplies the night attack version of the "head-up display" for the A-7E Corsairs, the only system of its kind in squadron service anywhere in the world.

Novel technology

The novel "head-up display" technology uses "diffractive optics"—light bending techniques—to combine the pilot's view of the scene ahead with symbolic data describing the aircraft's performance.

Earlier this month the company announced a new U.S. contract—potentially worth over \$100m—for the development of a new technology head-up display system for the U.S. Air Force.

The contract involves an initial head-up display order for development and prototype manufacture worth \$13m, with production options totalling about \$90m.

Pilot's flying aircraft equipped with head-up displays are able

to look ahead at all times and still gain essential instrument information without the need to take expensively trained eyes off the sky or ground to look down at the instruments.

The latest contract is to provide development information on head-up displays which will form part of the U.S. Air Force's LANTIRN programme. Marconi Avionics has already started work on the development work for the equipment destined for the U.S. General Dynamics F-16 fighter aircraft—already on order in very large numbers for European air forces—and the Fairchild A-10 close support aircraft.

LANTIRN is a low-altitude infrared night vision system for aircraft, which will enable aircraft to attack in day or night with equal effectiveness.

The proposal is for the new Marconi Avionics head-up display to project the image of the night scene, with instrument symbols, ahead of the pilot. The advanced technique involves the use of holograms, images generated by laser beams.

The new display system was developed in partnership with the Marconi Research Laboratories of Great Baddow which has been involved in holographic research for over a decade.

If the U.S. Air Force exercises its production options, Marconi Avionics will share the \$90m production work with two European partners in the current F-16 head-up display programme—Kongsberg Vapenfabrikk of Norway and Oldelft of the Netherlands.

By the end of this year, British companies manufacturing instruments for aircraft and for ground station use and those making airborne radio, navigation and radar aids are expected to have exported a record total of almost £100m of goods.

In the first six months of this year, according to the Society of British Aerospace Companies, the instrument makers exported £38.8m of equipment for aircraft and for use at airports. The total exports of airborne radio, navigation and radar aids came to £9.1m.

Advanced airborne radar is at the heart of yet another Marconi Avionics success story, the Airborne Early Warning Nimrod aircraft programme.

The Nimrod aircraft will carry radar in the nose and tail and will process signals using the biggest capacity airborne data processing system ever to be developed for use by the Royal Air Force.

Other developments to be shown at Farnborough, include the Marconi Space and Defence

Systems Volmet automatic equipment for airports. This converts standard telex reports of weather conditions at UK and some European airports into a computer-controlled and clearly spoken English voice. The equipment is now being installed at London's Heathrow Airport.

Prime contractor

This company is also prime contractor to the Ministry of Defence for the £950m Sting Ray sea and air-launched torpedo contract.

Aviolec equipment is also now being specified for space programmes. Ferranti's Inertial Systems Department based at Edinburgh announced last month its third contract to supply equipment for the Ariane rocket space programme. Ariane is a new company created by the major European aerospace companies to take over the management and marketing of the Ariane space rocket from the European Space Agency.

Ferranti's latest involvement is a contract for over £1m from Ariane for a further six inertial measurement systems for the rocket programme.

Elsewhere, in the conventional aircraft field, avionics equipment has had a profound

impact on aircraft designs and operational capability.

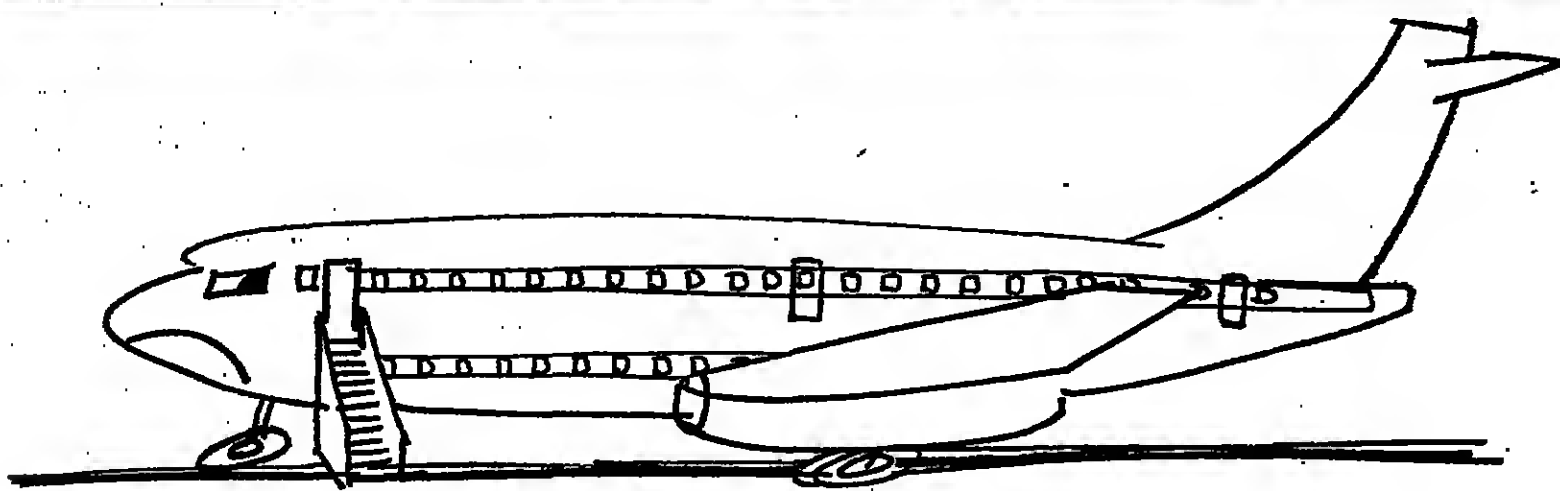
In some cases the advances in electronics have been so great and the benefits so cost-effective that aircraft designers have been able substantially to upgrade the performance of existing aircraft without major redesigning of the airframes.

The performance of the European A300 Airbus has also been improved with the introduction of improved all-weather landing aids. The airliner has been tested successfully with the "windshield guidance display" WGD 2. The system, designed for Airbus Industrie by SFENA (France) in conjunction with Bodenseewerke (West Germany) and Smiths Industries (UK), provides the pilot with information about ground taxiing under poor visibility. It is already in operation on A300 aircraft operated by the French Air Inter airline.

The new equipment also expands the field of vision of the pilot, provides improved symbols of aircraft performance data and enables the A300 Airbus to approach airfields in poor visibility, including those not equipped with instrument landing systems—precision approach systems installed at many airports.

L. McL.

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AEROSPACE VIII

Manufacturers confident of long-term rise in orders

ALTHOUGH THE re-equipment tide that has been flowing strongly for the past two years slackened in the first half of this year, in the wake of economic difficulties in many countries and the consequent financial problems for many airlines, demand for new aircraft is expected to pick up in the longer term.

Indeed, it is only in the major industrial countries of the West, and especially in the U.S. and Western Europe, that the slackening of the inflow of new orders has been noticeable. In the developing countries of the Third World demand for aircraft of all kinds has been substantial and sustained during the first half of this year.

As a result, although the 1980 total of new orders looked by the world's major manufacturers is not likely to reach the levels of about 1,000 aircraft or so reached in each of the past two years, it is nonetheless likely to be substantial, and all the aircraft builders are confident that in 1981 the volume of ordering will pick up again.

This belief is based on the fact that, whether they can afford it or not, most of the world's major airlines are now virtually obliged to replace most of their existing ageing fleets as soon as possible. This is due in turn to the fact that soaring fuel costs are making many existing types of jet airliners uneconomical—such as Boeing 707s, Douglas DC-8s, early models of the Boeing 727 and 737, Douglas DC-9, British Aerospace Trident and One-Eleven, many of which have been in service for 15 years or more.

Too noisy

At the same time many of these older jets are becoming unacceptably noisy to an increasingly environment-conscious age, with more and more anti-noise legislation directed against civil aviation.

The major world aircraft manufacturers' estimates of future demand vary, but these differences are small, and in broad terms they foresee a demand for somewhere around 3,000 new aircraft—or more than 3,000 aircraft of all kinds—between now and the early 1990s. These orders will be in addition to the 2,500 or so aircraft ordered in the past few years that have been flowing since early 1978, so that

a total inflow of more than 5,500 new aircraft is likely by the early 1990s.

While some of the world's major banking and other institutions have recently expressed concern over the airlines' ability to finance this kind of fleet re-equipment in the light of the airlines' current financial difficulties, it is generally accepted that the recession and the associated difficulties are cyclical in nature, and that when compared with the overall life of an aircraft in service of some 15 years or so, the current trough is not likely to seriously affect the long-term re-equipment situation.

While some of the manufacturers may also trim their production schedules back a little to cope with the dip in orders, in most cases they remain fully committed and are working at maximum pressure to meet the commitments already undertaken. In some cases this means increasing current production rates of aircraft and engines—for example on the Airbus and the Rolls-Royce RB-211 engine—so as to meet contract dates.

Manufacturers' confidence in the longer term future is epitomised by Lockheed California Company, which manufactures the L-1011 TriStar family of three-engine wide-bodied jets. Lockheed recognises the current economic problems confronting the airlines but nevertheless believes that world traffic growth will be such during the 1980s that by 1988 the total of revenue passenger-miles (r.p.m.s) flown (the yardstick of air transport output) will amount to no less than 940bn a year, or nearly twice the 488bn r.p.m.s flown in 1978.

Translating this expansion into aircraft procurement terms, Lockheed believes there will be a market for about \$99bn of new airliners by about 1989, of which about \$17bn (or some 975 aircraft) will be in the short-range category, about \$42bn, or 1,310 aircraft, in the short-to-medium range category, and about \$40bn, or some 765 aircraft, in the long-range class.

Of this \$99bn of orders, some \$34bn will be for current models already in production, with about \$45bn being spent on new models either under development or planned for the immediate future.

In the short-range class the most significant models will be

the present Boeing 737 and the McDonnell Douglas DC-9, both of which are being improved for the future. Boeing is developing ideas for an improved 112-seat Boeing 737-300, with new engines (such as the Rolls-Royce/Japanese RJ-500 or the Franco-U.S. CFM-56 Dash 3), while McDonnell Douglas is already offering the DC-9 Super 80 of about 120 seats.

New short-haul jet airliners in this class also under development include the Boeing 757 twin-engine narrow-body transport, while Fokker of Holland is exploring the possibility of developing a new twin-engine F-29 airliner.

The short-to-medium range class of airliners is the most crowded arena, for this is where the bulk of the future orders are likely to be placed. Existing aircraft that will serve this market include the Boeing 727, probably in improved form, together with the Airbus Industrie A-300 250-seater, and the shorter-range versions of the existing Lockheed TriStar and Douglas DC-10.

Newcomers

But many new airliners are also being either developed or proposed for this class of traffic. They include the 200-seat Airbus A-310 and the "semi-wide-bodied" Boeing 787, and most important, a new airliner from McDonnell Douglas, the Advanced Technology Medium Range (ATMR) transport, now to be called the DC-XX.

This will be a twin-engine, airliner, designed to carry about 178 passengers over distances of up to 2,500 miles, to compete primarily with the Boeing 757 and also to some extent with the Airbus A-310 and Boeing 787.

McDonnell Douglas has been exploring the market possibilities of this aircraft with the airlines for some time, and is expected to launch the airliner formally some time later this year, when it hopes to be able to announce an order from one of several U.S. major domestic airlines which have been showing increasing interest in the aircraft.

McDonnell Douglas's interest in developing this aircraft stems from its belief that without the ATMR, the bulk of the short-to-medium range market for aircraft of around 178 seats during the 1980s will go by default to Boeing with its 757.

The only other possible contender for this market would be an aircraft from Airbus Industrie of Western Europe, which has been discussing for some time the possibility of building what it calls the SA (for Single Aisle) range, of airliners variously seating between about 130 and 160 passengers.

But so far both Boeing with the 757 and McDonnell Douglas with the ATMR are much further down the development road than Airbus Industrie. The latter company has still not finalised a design, and there would have to be extensive European inter-Governmental discussions on financing such a development, as well as detailed industrial negotiations on work-sharing, before any Airbus SA venture could get rolling.

The serious danger now confronting Airbus Industrie and the Western European aerospace industry in general is that if McDonnell Douglas does launch the ATMR, that company and Boeing with the 757 could capture a substantial slice of the available market before Airbus Industrie could even be in a position to compete.

A decision on an SA series aircraft, therefore, is now a matter of considerable urgency, if Western Europe wishes to remain in the big market for this class of aircraft in the 1980s and beyond.

In the long-range class of aircraft—airliners capable of carrying large loads of more than 300 passengers, over distances of 5,000 miles or more—the market seems likely to be dominated for years to come by the existing "Big Three"—the Boeing 747 Jumbo jet, the McDonnell Douglas DC-10 and the Lockheed TriStar.

Although Airbus Industrie has a plan to build a four-engine long-range 210-seat airliner, the TA-11, this seems likely to take second place when it comes to allocation of cash and other resources to such other developments as the improved Airbus A-300 Series 600, the stretched 300-350 seater short-to-medium range version of the A-300 Airbus, the TA-9 and the smaller SA series of jets.

Boeing has already announced a bigger version of the 747, with a stretched upper deck, to seat overall about 469 passengers, and it has longer-term plans for further stretches of the aircraft in various ways—either by extending the upper deck or

lengthening the fuselage, or both—so that eventually Jumbos of up to 700 passengers may emerge, with the 1,000-seater a possibility looming on the distant horizon.

To compete with these plans, both Lockheed and McDonnell Douglas have ideas to stretch the TriStar and DC-10, but these are currently taking second place in both manufacturers' plans to the need to improve the performance of existing models of those aircraft, so as to provide customers with the best possible fuel consumption through the early to mid-1980s. While extended-body TriStars and DC-10s are not ruled out, they may still be some years away.

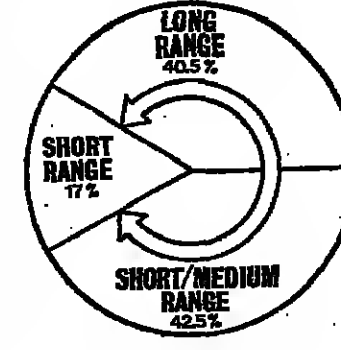
M.D.

MARKET FOR WORLD COMMERCIAL JET TRANSPORTS

EXPECTED SALES, 1980-89*					
Category	Market	Current models	Future models		
Short range	\$17bn	B-737 DC-9	F-29 757	\$16bn	
Short/medium range	\$42bn	B-727 A-300 DC-10 L-1011	A310 747 L-1011-long body DC-10 long body ATMR	\$25bn	
Long range	\$40bn	B-747 B-747-SP DC-10-30 L-1011-500	747-derivative DC-10-30 stretch L-1011-500 VLR (Very long range)	\$10bn	
Total†	\$99bn	\$54bn	\$45bn		

*Excludes all-cargo aircraft, †1980 dollars.

Source: Lockheed California Company



'Big three' engine makers compete at all levels

AERO-ENGINE manufacturers the world over are facing their toughest battles ever, as airlines continue to re-equip with new fleets and new technology engines to meet the soaring cost of fuel over the remaining years of this century.

Despite economic difficulties in some countries of the Western world, and recession in the U.S. and Western Europe, the outlook for aero-engines, as with airframes, remains buoyant.

Although the inflow of new orders has slowed perceptibly over the first eight months of this year, especially in the U.S. in the face of the recession there, most manufacturers in both airframes and engines believe this to be a temporary situation, and that the outlook for air travel remains strong in the long-term.

In any event, the existing fleets in many airlines worldwide must be renewed, because they are ageing and becoming increasingly fuel-thirsty and unacceptably noisy, and as a result the market for both airframes and engines is likely to continue to be strong.

It is noticeable that the slowdown in orders has mainly occurred in the more developed countries of the West—the U.S. and Western Europe—whereas the demand in the developing countries of the Third World has remained high.

For the long-term market for civil aero-engines worldwide through the 1980s is estimated at not less than \$20bn, or between a third and half of the total market of about \$43bn (about \$100bn) that is likely to be spent on some 3,000 aircraft of all kinds still needed to replace existing fleets, and to meet the anticipated growth of traffic in the middle to late 1980s.

Smallest share

There are three major manufacturers in the world aero-engine market—Pratt and Whitney of the U.S., the biggest with about 42 per cent of the current civil airliner market; General Electric (GE), also of the U.S., with about 17 per cent; and Britain's Rolls-Royce, the smallest in terms of total market share, with about 15 per cent.

Collectively, these three account for about three-quarters of the total world market, the remainder of sales being covered by the smaller manufacturers such as Snecma and Turbomeca of France, CFM International (jointly owned by Snecma and General Electric), Fiat of Italy, Motoren und Turbinen Union (MTU) of West Germany, Volvo of Sweden, and others such as Pratt and Whitney of Canada, and Garrett of the U.S.

The competition between the "Big Three" occurs at virtually all levels throughout the market, although there are some noticeable gaps, where one manufacturer or another is not yet involved.

At the top, in the big 400-plus seat Boeing 747 Jumbo jets, where Rolls-Royce has won a niche with its RB-211-524 engine, the competition is mainly between General Electric with the CF6-50 series, and Pratt and Whitney with the JT-9D series of "big thrust" engines. Various versions of all these engines are available already at thrusts up to 56,000 lbs. But all three manufacturers have plans to push their engines even further, to 58,000 lbs (as in the GE CF6-80 Series), and they can even go to 60,000 lbs if necessary to meet demand from the airlines for "stretched" versions of the Jumbo jet seating up to 700 passengers or more through the 1980s and beyond.

In the other "wide-bodied" airliners, Rolls-Royce has so far retained the coveted position of sole engine supplier in the Lockheed TriStar, with various versions of the RB-211. But this engine is not installed on the McDonnell Douglas DC-10, where the battle is between General Electric and Pratt and Whitney, with the CF6-50 and JT-9D series respectively.

Further down the size scale, Rolls-Royce so far has not won any orders for its engines in

the 250-plus seat A-300 European Airbus, or in the smaller 200-seat A-310 version, although one version of the RB-211, the Dash 524C, is on offer, and the competition here is again between the two U.S. giants, GE and Pratt and Whitney.

Particularly fierce competition also prevails in the market for the smaller, twin-engine airliners, seating about 200 passengers and upwards—notably the Airbus A-310 and the Boeing 767 semi-wide-bodied airliner, for which General Electric is offering the new CF6-80 series while Pratt and Whitney is offering its new JT-9D-7R4 model of about 44,300 lb thrust and upwards.

This is one of the classic competitive arenas for these two aero-engine manufacturers—just as it is for the two main airframe builders, Airbus Industrie and Boeing. Many billions of dollars in orders have yet to be won, for it is expected that several hundred A-310s and 767s will eventually be ordered. These two airliners effectively cover a large slice of the replacement market among the world's airline fleets.

Rival soon

Below this category of aircraft in size lies another major market, for narrow-bodied aircraft of about 170-180 seats, effectively meeting the requirement for a replacement for the highly successful Boeing 727, as well as for Boeing 707s and Douglas DC-8s. This market need is currently being met by the new 178-seat Boeing 757 twin-engine airliner, but this is expected to be replaced by the new 178-seat McDonnell Douglas Advanced Technology Medium Range (ATMR) transport, on which a formal launch decision is likely before the end of this year.

Until early this year Rolls-Royce held the position of sole engine supplier for the 757, with the Dash 535 version of its RB-211 engine of 36,500 lb thrust, with "launching" orders placed by British Airways and Eastern Airlines.

But in recent months, two other airlines have placed small orders, Aloha of Hawaii and Transbrasil of Brazil, both specifying General Electric CF6-32C engines of 36,500 lb thrust. Moreover, several major U.S. airlines (United, American, Delta and Continental) are studying the 757, either as a replacement for their ageing 727 fleets or as a complementary aircraft for fleets of new 767s which some of them have ordered. Since the 757's use either General Electric or Pratt and Whitney powerplants, it seems likely that any of those

U.S. operators buying 757s will also want U.S. engines, rather than Rolls-Royce RB-211-535s.

Rolls-Royce has always recognised the fact that it would face severe competition in the 757 from the U.S. engine companies, and it will consider that it has done rather well if it can retain around one-third of total 757 sales with its Dash 535 engines.

General Electric is developing its new CF6-32 engine for the 757 in conjunction with Snecma of France, Volvo of Sweden and Alfa Romeo of Italy, and intends to have it ready by 1983. But Pratt and Whitney is also now moving in strongly with its new JT-10D-222 engine, originally designed for 33,000 lb thrust, but now being upgraded to 36,500 lb to meet the competition from GE with the CF6-32, and from Rolls-Royce with the Dash 535. The JT-10D is being built by Pratt & Whitney in conjunction with MTU of West Germany (12 per cent) and Fiat of Italy (4 per cent).

These three engines—CF6-32, JT-10D and Dash 535—are also on offer to the airlines in the new McDonnell Douglas ATMR, so that another classic battle seems likely to occur between the big three engine builders, just as it will be fought between Boeing and McDonnell Douglas on the airframes.

These engines are also all being offered as potential powerplants for any new 130-160 seater jet airliners that Airbus Industrie of Western Europe may decide to build, in what it calls the "Single Aisle" SA series, to compete with the 757s and ATMRs at the lower end of the size scale.

Coming further down the scale in aircraft sizes, it is now clear that a major market is opening for aircraft of about 100 to 130 seats, for the middle to late 1980s and beyond. This market is already being served by the new McDonnell Douglas DC-9 Super 80, with the Pratt & Whitney JT-8D-209 engine, but Boeing is preparing to move in with a new 112-seat version of its highly successful Model 737 airliner, the Series 300.

Rolls-Royce stands a good chance of winning a place in this programme, with its new RJ-500 engine of 20,000 to 22,000 lb thrust, now under development with the three major Japanese aero-engine companies, Ishikawajima Harima Heavy Industries, Kawasaki Heavy Industries and Mitsubishi Heavy Industries.

But here, too, there is the prospect of intense competition, with CFM International (the joint company formed by Snecma of France and General Electric) offering a new version of the CFM-56 engine, the

Dash 3, of about 20,000 lb thrust.

Pratt and Whitney is also in this market, with the new JT-8D-209 of 18,500 lb thrust and the bigger JT-8D-217 of 20,000 lb (while it even has another new version under consideration of 22,000 lb thrust). Pratt and Whitney's position in this area of the overall engine market is very strong, however, for its JT-8D engines in various versions, already power the existing 737 and the Boeing 727, and over 11,000 of these engines have been sold in various versions, covering some 3,600 aircraft, including more than 1,500 727s, over 1,000 DC-9s and over 700 737s.

Vast market

These are not the only competitive arenas in the world civil engine market. Below these types of aircraft and engines, in the 100-seater and smaller category of aircraft, there is a vast market for engines of all kinds to fill the growing demand through the 1980s for airliners ranging from eight- to 30-seat executive jets, through the 30-50-seat "commuter" range, up to the "baby" Airbus A-350-800 aircraft such as the British Aerospace BAe 146, seating up to 100 passengers.

It is in these markets that the other major aero-engine manufacturers, outside the big three, have a major opportunity to win major sales successes.

Already, for example, Avco Lycoming of the U.S. has won the engine contract for the BAe 146 with its ALP-502H jet engine, while Pratt & Whitney Aircraft of Canada has already won substantial orders for its turbo-propeller engines in the da Havilland Canada Dash 7 50-seat feeder-liner, and in the new Dash 8 twin-engine 32-36 seater airliner. General Electric has been chosen to supply the engines for the new 44-passenger commuter airliner now being jointly developed by Saab-Scania of Sweden and Fairchild Industries of the U.S. These will be new technology, fuel-efficient 1,500-plus shaft-horsepower turbo-prop engines, called the GE CT7, which Saab and Fairchild say offers a 5 to 15 per cent better fuel consumption than rival new engines evaluated.

Throughout the world's aero-engine manufacturing industry, the emphasis is on providing a wide spectrum of powerplants that will be quieter, more fuel-efficient and with minimal pollutant qualities for the new generation of airframes now under development for the mid to late 1980s and beyond.

M.D.

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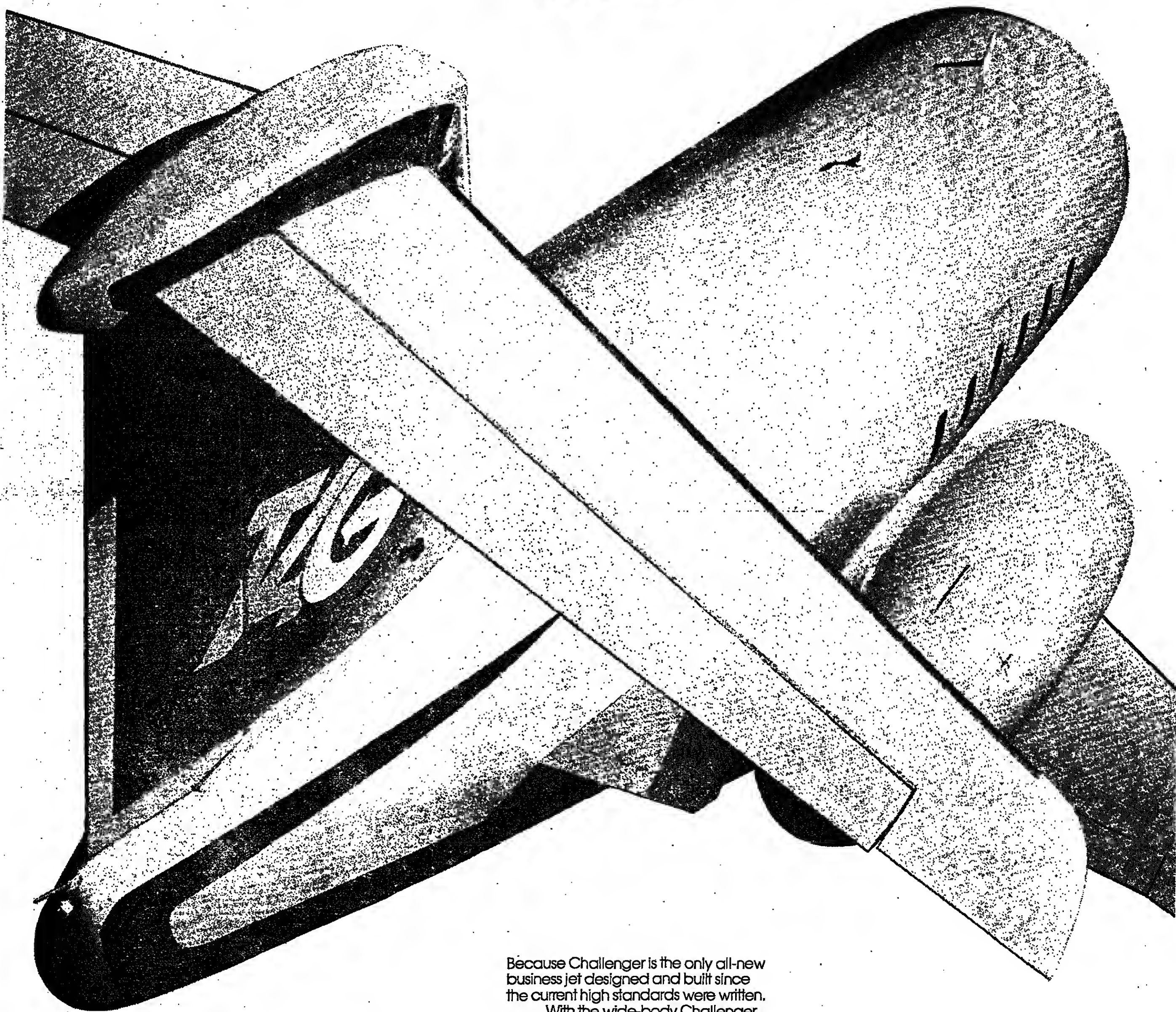
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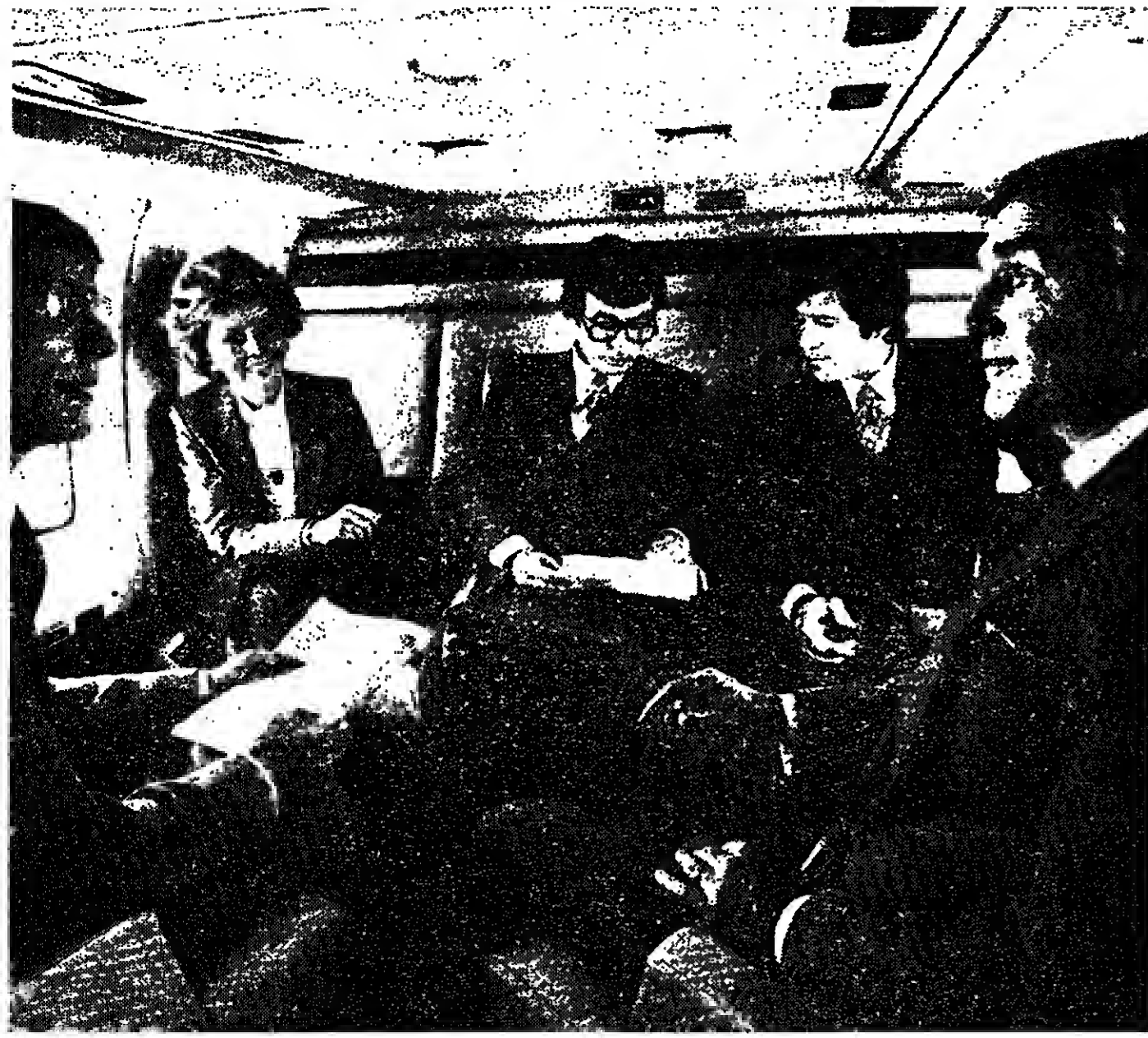
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UNITED STATES

Builders' earnings may slip as recession hits airlines

TO LOOK at the financial results so far this year of Boeing, the world's largest manufacturer of civil aircraft, you would not think the U.S. aircraft industry had a cloud on the horizon. Boeing, which regularly takes between 60 and 75 per cent of the world's airliner orders, lifted its first half profits by 29 per cent to \$295m on sales which were also a comfortable 24 per cent higher.

But the impression is somewhat misleading because Boeing and its two smaller U.S. rivals in the field, Lockheed and McDonnell Douglas, are down the line from the worst mass they have seen in recent years in their key market, that of the U.S. airlines.

Collectively, the U.S. carriers lost \$475m in the first half of this year (the previous record loss for a whole year was just \$27m). There is scarcely a major carrier left which is still paying a dividend and the industry is beset with rumours of mergers involving the weaker carriers such as Continental and Braniff International. Traffic down a record 2 per cent in the first half in the U.S., has slumped just as the airlines, freed by deregulation from many constraints, are locked in what could be mortal combat on prices on plum routes.

So far Boeing has registered these facts only by announcing that it will reduce its current record levels of airliner output by 12 per cent in 1981, a move not expected to produce any lay-offs in Seattle as the company will be able to employ its existing workforce on the labour-intensive extensions to its product range as the new Boeing 757 and 767 jets start to roll off the production lines in 1982.

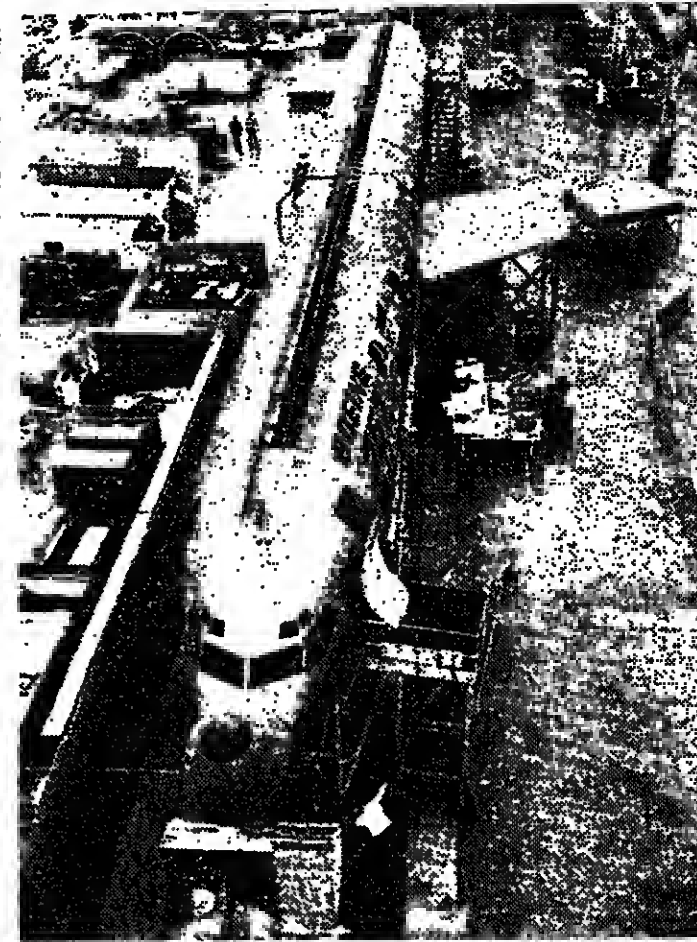
But by 1982 industry analysts expect to see Boeing's earnings slide as it starts to suffer from the downturn in ordering rates which is bound to stem from the current recession in the U.S. at the same time as its production costs accelerate in the early stages of the new programmes. Mr. Paul Nisbet, aerospace analyst for Bache Halsey Stuart Shields, for example, foresees industry output in 1981 15 per cent lower than in 1980, and in the current year, to be followed by a further 5 per cent cut in 1982.

Chill breeze

For Boeing this represents a chill breeze rather than a hurricane. In contrast to the 1969 recession, which brought Boeing into a close call with bankruptcy as it struggled with the production launch costs of the 747 Jumbo jet and inefficiencies in current lines, there is general confidence that Boeing faces a slight dip in earnings rather than any serious erosion of its domination of the industry.

For Lockheed and McDonnell Douglas, the outlook is not so reassuring. So far as civil aviation is concerned, Lockheed is a one product company, still wrestling to bring under control the production costs of the L-1011 TriStar.

Lockheed has so far written off more than \$1bn on the 12-year-old programme, having escaped bankruptcy itself a decade ago only with the help of the Government. TriStar write-offs of \$70m in the second quarter were much greater than expected and in spite of brave words from Mr. Roy Anderson, the company chairman, there is real anxiety that



A mock-up of the new Boeing 757 twin-engine jet airliner seen at Boeing's Renton, near Seattle, factory. The aircraft, to be powered by the Rolls-Royce RB-211 Dash 535 engines, has been ordered by British Airways and Eastern Air Lines of the U.S.

the L-1011 may never show profits.

This raises the important question as to whether Lockheed will be able to finance a second civil airliner programme, probably something in the medium range, of twin engine capacity, such as the Boeing 757 and 767, the DC-XX now being contemplated by McDonnell Douglas, and of course the Airbus, which has transformed the competitive structure of the industry.

It is ironic that the TriStar's pool of red ink is getting deeper as the aircraft's commercial success increases. Lockheed's considerable recent successes in the Middle East market have enabled it to step up production of the aircraft from 13 last year to 26 this, but unit costs on the project remain out of control because of Lockheed's labour and supply problems.

McDonnell Douglas's woes are of a slightly different character. Along with the airlines which operate the DC-10, the company has still not recovered from the May 1979 crash of a DC-10 near Chicago. A significant portion of the air-travelling public still appears to be boycotting the DC-10 and so not surprisingly McDonnell Douglas is having trouble finding orders. As the accompany-

ing table shows, the rate of orders is sharply down with only two placed in the last quarter. Meanwhile the DC-9 Super 80 has been suffering certification delays in the U.S. because of alleged problems in testing, a matter which has not helped the company's image. These difficulties have led the more pessimistic observers to wonder whether Lockheed and/or McDonnell Douglas might not one day judge themselves to be better off outside the civil field, enabling them to focus on profitable defence work.

This, as Mr. Nisbet says, would be a shocking development in either case and it is one which McDonnell Douglas has partly laid to rest with the recent authorisation of further funds for its own twin-engine medium range aircraft, the Advanced Technology Medium Range aircraft, now renamed the DC-XX. Actually the company is still some way from backing the more than \$1bn project, but it is under pressure to do so from airlines unhappy about reduction of competition in the industry. McDonnell Douglas for its part wants financial commitment from the airlines which are pushing it and at the moment, with the current state of the U.S. airline

industry, that is the impasse. The answer, ultimately, rests heavily on the profitability and scale of the Lockheed and McDonnell Douglas defence programmes. For Lockheed, 57 per cent of whose sales are to the U.S. Government, further developments in transport aircraft promise a stable future, along with the company's heavy involvement in sea-launched ballistic missiles.

McDonnell Douglas is facing uncertainty over its F-15 fighter programme. This lighter weight fighter has suffered serious cost overruns, at least in part because of hesitation about its status by the Government. The company has done well in foreign markets, however, winning the Canadian Air Force contract earlier this year with the F-18, and remains an extremely strong defence company. Once DC-10 development costs are covered—say, by 1982—earnings should improve.

Confidence

Although there are many uncertainties in the defence programme there is growing confidence that whatever the outcome of the Presidential election, real defence expenditure will be increased beyond the somewhat cosmetic increases announced by the Carter Administration earlier in the year in response to the Afghan invasion. Given Mr. Reagan in the White House, defence analysts foresee at the very least an end to the tussling between Congress and the Administration over defence spending. The big long-term decision for the new Administration will be whether to fund a new bomber programme or whether to go ahead with the mobile MX missile system as currently envisaged.

On the space front the industry is hoping that the Space Shuttle will indeed be launched next spring, having already been delayed by two years. The success of that project might push more funds in the direction of NASA, which is the only sector of the industry to have shown an absolute decline in sales in the last decade.

For the most part the past decade has been one of great progress—and it ended with the industry showing a remarkable \$7.9bn positive trade balance, a contribution second only to that of U.S. agriculture in 1979.

In spite of the worries about the American airlines today, there is little doubt that the longer term prospects for growth in air transport promise a bright future for those companies able to offer the right product when the market wants it. Boeing has conspicuously met that requirement and, allied with its recent triumph in winning the prime contract for the Cruise missile, the Seattle company presents a formidable competitive force to those who must challenge it in the 1980s.

Ian Hargreaves

CIVIL AIRCRAFT ORDERS AND DELIVERIES

	707	727	737	Boeing 747	757	767	Total	McDonnell Douglas DC-9	DC-10	Lockheed L-1011
Orders										
1979	1	110	76	75	0	51	313	49	34	33
1st half 1980	18	78	66	40	8	17	227	20	6	10
Deliveries										
1979	6	136	77	67	0	0	286	39	36	14
1st half 1980	1	70	49	37	0	0	157	12	35	11

Source: The Companies.

ITALY

Lack of coherent strategy puts industry in difficult position

THE ABSENCE of a coherent Government strategy for the Italian aerospace industry is becoming steadily more evident—and steadily more serious. A sector which for several years has managed to make impressive progress on several fronts is now aware that without greater State aid and an integrated consistent policy on the part of the Government it faces a much rougher ride in the years to come. The issue is doubly important since aerospace is precisely the sort of high technology export-orientated field where an industrialised nation like Italy should excel if it is to lay the foundations of sound growth in the difficult economic years of the 1980s.

So far, though, little has been forthcoming. Yet if a coherent plan to rationalise the sector—and pump money into research and development in particular—does not emerge the gap between Italy and the leading aerospace powers of Europe, especially France and the UK, can only increase. Today, despite a 25 per cent increase in total turnover to L1,120bn (\$1.3bn) in 1979, the Italian aerospace industry is barely a quarter of the French, while its total workforce of 38,500 compares with some 200,000 in Britain.

The gravest danger, though, is that the excellent achievements of the past few years might mask the underlying need for greater Government attention. Aerospace is no exception to the imponderable common to Italian industry: just how long will the enterprise and resilience of frequently small and medium-sized companies be able to compensate for the lack of a credible guiding hand at the centre?

At first glance all might seem well with the sector. That 25 per cent growth in turnover represented 3.3 per cent in real terms, against 7 per cent in 1978. Investment spending is scheduled to make its biggest ever advance this year, to L185bn (\$220m) from L100bn in 1979 and L75bn the year before. Most of the major companies in the field are profitable, with the exception of Aeritalia, the biggest single

group operating in the sector, and a subsidiary of the Iri State-owned conglomerate. Even then, Aeritalia's financial problems are as much as anything the consequence of delays in final payments by the Government for completed contracts relating to defence procurement.

In industrial terms Aeritalia, the product of the merger of Fiat's non-engine aerospace interests with those of IRI/Finmeccanica, seems to be flourishing. It has a stake in Boeing's 767 medium-range passenger aircraft which, if sales projections are fulfilled, should generate \$2bn of business for the Italian manufacturer. This is to be set alongside the work it continues to do on the DC-8 and DC-10 aircraft of McDonnell Douglas.

There are also indications that following Alitalia's purchase of the A-300B European Airbus as part of the State carrier's fleet modernisation programme, Aeritalia is putting out feelers for collaboration on the project with Airbus Industrie. It remains to be seen, however, whether sufficiently attractive terms can be worked out for what would be essentially subcontracting work.

All these deals are especially important for Aeritalia in that they constitute a shift away from the company's hitherto preponderant commitment to the military sector into civilian aerospace work (where the financial rewards are greater and more swiftly delivered). The current lynchpin of Aeritalia's military work is the Tornado Multi-Role Combat Aircraft, jointly under construction by Britain, West Germany and Italy. Italy is due to take up 100 of the aircraft to bolster the currently inadequate fighting strength of its Air Force, and the first is due to be delivered in 1981.

Further into the future there is the prospect of the AMX, the all-Italian light fighter, and the all-Italian support aircraft, which will be a joint venture between Aeritalia and the Varese-based Aeromacchi, the country's leading private sector

CONTINUED ON NEXT PAGE

AEROSPACE XI

RUSSIA

A major emphasis on air transport

VAST DISTANCES, a dramatically inadequate road and rail network and enormous areas of trackless desert, tundra and permafrost ensure that air transport plays a major and expanding role in the Soviet Union. The current five-year plan period, which ends in December, has faced the additional task of building new or expanded airports at the five Olympic centres of Moscow, Kiev, Tbilisi, Minsk and Leningrad.

Thanks to substantial assistance from Western contractors like the West Germans, who built Moscow's new Sheremetyevo 2 airport, all the new Olympic airports were built on time and many other smaller airfields were either extended or modernised to cope with steadily growing traffic.

But a series of fatal crashes and delays in the introduction of new aircraft types have caused growing problems. Over the past year all four of the Soviet Union's main civil aircraft have been involved in fatal crashes involving heavy loss of life. A Tu-154 tri-jet crashed shortly after take-off from Alma Ata airport in Kazakhstan in July killing all aboard. This followed closely after a similar disaster, also in central Asia, a month earlier when a small Yak-40 crashed.

These crashes were preceded in March by the loss of a Polish Airlines D-62, which stalled on approach to Warsaw airport, and the loss of two Tu-134 jetliners which crashed in mid-air over the Ukraine in August last year, killing all 173 people aboard.

As if this were not enough the Tu-144 supersonic aircraft now appears to have been withdrawn indefinitely without ever having entered full commercial service.

Like the Anglo-French Concorde, the Tu-144 was conceived as a high-prestige product which would act as a living demonstration of Soviet aeronautical prowess. In fact it has turned out an expensive white elephant than the Concorde. The Tupolev design bureau has not been able to overcome the engine problems, fuel-distribution and structural defects which have dogged its progress for over a decade.

Deprived of its expected flagship, the State airline Aeroflot pinned its hopes on the new generation of aircraft emerging from Soviet factories.

Of these the most important are the IL-86 airbus, the IL-76 heavy transport and the Yak-42 medium-range feeder jet. Large numbers of these modern jet aircraft are scheduled for production over the next decade to supplement and eventually succeed the present work-horses of the Aeroflot fleet—the IL-62 (virtually a pirated version of the British VC-10) and the Tupolev 154 and 134. Together these relatively new aircraft, introduced over the past decade, carry around 60 per cent of the

more than 100m passengers flown by Aeroflot every year. The failure of the airbus and the Yak-42 to appear in time for inclusion in regular flight schedules covering the Olympic Games has been a major blow. The airbus has the theoretical capacity of around 400 passengers with their luggage and cargo. In fact, however, the current versions of the aircraft suffer from thirsty but underpowered engines, a major weakness of the Soviet civil aviation industry.

The airbus appears to have undergone considerable redesigning since its first conception as a rear-engine aircraft with four engines housed in pairs either side of the tail-fine assembly, as in the IL-62. Now the engines are slung in pods under the wings. At some stage in the future the airbus might well be re-equipped with more powerful engines. Until then, however, it will remain underpowered.

The engines are believed by Western experts to develop a thrust of around 28,000 lb compared to the over 50,000 lb delivered by the engines of comparable Western aircraft such as the European Airbus. The new aircraft is believed to have a maximum range of 3,000 miles and a maximum speed of 600 mph, but is likely to be flown at lower speeds in order to economise on fuel and allow heavier loading. It is already over four years since the first prototype flew in 1976. Full-scale production was scheduled to begin at the Voronezh aircraft complex in Central Russia in January 1977.

Problems caused by the late introduction of the airbus have been exacerbated by signs of engine problems and fatigue which have started cropping up in some of the older IL-62 aircraft. These problems emerged dramatically this year following the Polish IL-62 crash at Warsaw airport in March.

The crash investigation pointed to fatigue in the aircraft's engines and inspection of IL-62 aircraft belonging to Aeroflot and East European airlines revealed similar problems. This has necessitated extensive overhaul and repair work. The diversion of men and resources to solving these problems is believed to have been a factor in the delayed entry into service of the new generation of aircraft.

The absence of reliable, powerful and fuel-efficient civil aviation engines reflects the fact that most of the skills in the industry are engaged in the development of military jet, rocket and helicopter engines. Civil aircraft engine development has had a lower priority. But a major effort appears to have been directed towards developing a new medium-sized, fuel-efficient engine for the new Yak-42, the 120-seat replacement for the tough little Yak-40. An export sales drive is being

mounted by Aviaexport, the Soviet aircraft sales organisation, for this aircraft. Its makers claim that the new engines use less fuel than the Yak-40 and have achieved over 95 per cent fuel-burning efficiency. Yak-42 is being offered in three versions: as a 120-seat passenger aircraft; as a 76-seat passenger and cargo variant or as a convertible with a cargo hatch. The maximum payload is 14,500 kg, with a cruising speed of 820/850 km/hour and a range of 3,000 km.

Limited exports

It remains to be seen whether this new aircraft will find any buyers in the West. So far the Soviet aircraft industry has sold its products mainly to Aeroflot itself and the airlines of its Comecon and Third World allies, including Cuba. Its export record in Western markets is extremely limited.

This is partly because Soviet aircraft tend to be a full generation behind aircraft development in the West, partly because of the relatively unsophisticated electronics and partly because of the absence of service and spare parts back-up system outside the Communist bloc.

One exception to this rule has been the Yak-40, of which over 1,000 units were built during the past decade. Production was

phased out as the Yak-42 production line took over production space in the Saratov plant south of Moscow. Yakovlev specialises in the production of sturdy, tough-duty aircraft capable of flying feeder routes out of unmetalled provincial airports.

With this sort of capacity the Yak-40 attracted interest from buyers in Yugoslavia, Italy, West Germany and Canada, as well as among several African and Asian airlines. Total sales to hard currency markets remained small. But the aircraft's potential attracted Western interest, particularly from the U.S.

Rockwell Corporation commissioned a marketing study to assess its potential and this was then purchased by a Washington aircraft consultancy firm ICX-Avionics. ICX subsequently entered into negotiations with Aviaexport, Licensiorg and other Soviet trade bodies. These culminated in a complex tripartite agreement last December under which ICX agreed to purchase design and performance data, manufacturing technology and blueprints and production facilities. The deal involved the purchase of nearly 1m documents and over 20,000 tools.

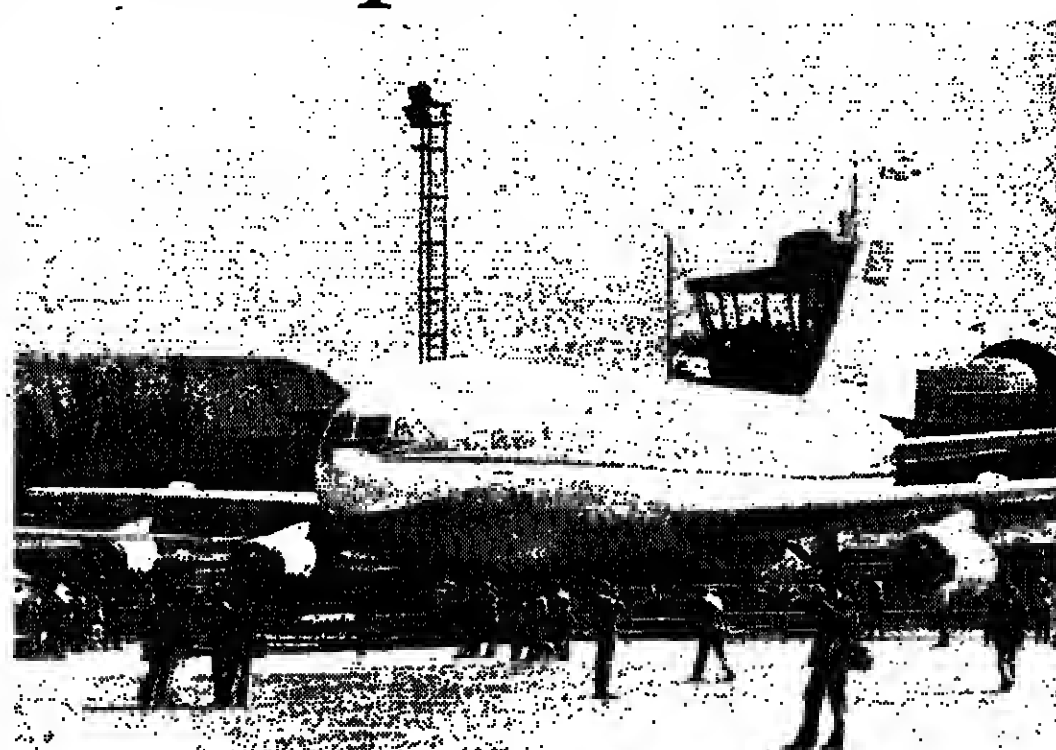
The idea was for ICX to build the airframe using Yakovlev designs and tools

taken from the Saratov plant and re-installed in a U.S. factory. This U.S. plant would assemble the Soviet airframe and landing gear, equip it with U.S. avionics and U.S. engines and then market the aircraft worldwide as a rugged and reliable feeder aircraft.

ICX calculates that the potential market for such aircraft over the next 20 years could be around 1,800, of which 20 per cent would be in the U.S. itself. Unfortunately, however, signature of agreement last December was followed shortly afterwards by the Soviet invasion of Afghanistan. This effectively halted in its tracks the possible provision of the Federal and State funds needed to start production at the proposed factory site in Wheatfield, New York State. The whole scheme is currently in abeyance pending improvement in U.S.-Soviet relations.

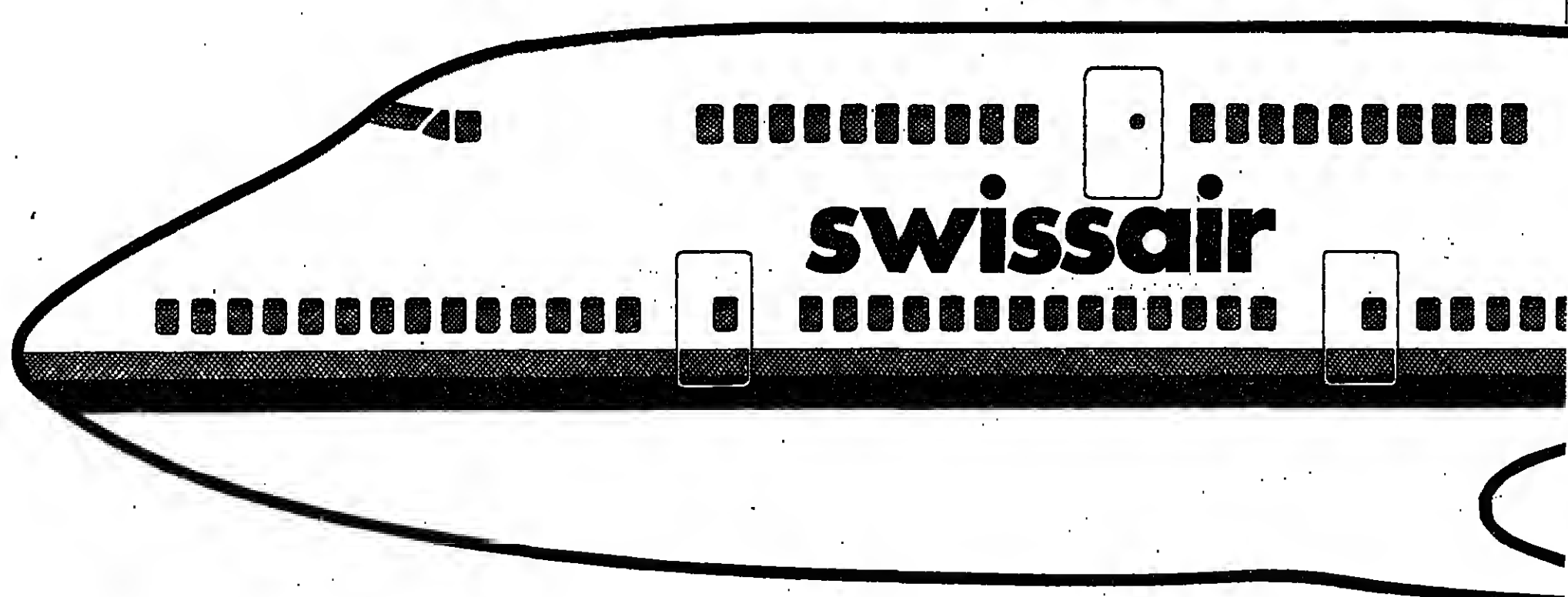
Meanwhile the Soviet aircraft industry is building up considerable expertise in various specialised fields including helicopters, hovercraft and dirigible airships, for which it sees a bright future as supplier of heavy plant and equipment to the major oil, gas and raw material projects in the north and in Siberia which are planned for this decade.

Anthony Robinson



The Ilyushin IL-86 four-engine short-to-medium range wide-bodied transport is now in production at Voronezh for Aeroflot, the Soviet airline. Designed to carry up to about 350 passengers, the IL-86 is widely referred to as the Soviet Union's "Airbus" and it is likely to be of major importance in extending the development of civil aviation inside that vast country

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Lack of strategy

CONTINUED FROM PREVIOUS PAGE

aerospace company. The AMX, which would replace the ageing Fiat G-91, still in service with the Air Force, would be powered by the Rolls-Royce Spey 807 engine, to be built under licence by Fiat and Alfa Romeo in Italy. The Turin-based motor group has recently assumed overall responsibility for the country's aero-engine industry, IRI/Finmeccanica, Alfa Romeo's parent, the central role in the development of Italy's nuclear industry.

Prospects for the AMX, due to make its maiden flight in 1982, are still somewhat conditioned by political considerations. But its chances of going into full production took a giant stride forward with the news last March that Brazil will participate in its development in a deal that might generate £330bn of additional sales. This is besides the 200 to 250 of the aircraft required by the Italian Air Force itself.

Meanwhile Aeritalia is also responsible for the G-222 military transport, which has achieved export success, both in the Middle East and Latin America as well as being heavily used by the Italian armed forces.

The other focal point of the public sector's involvement in the aerospace sector is the Agusta helicopter group—a rare example of profitability in the deficit-ridden world of Italian State enterprise, and 51 per cent owned by the Enim mineral-to-arms conglomerate. Agusta includes several companies: Giovanni Agusta, Sai Marchetti, Elicotteri Meridionali and Industria Aeronautica Meridionale, to name but four.

In 1979 it raised its sales by 42 per cent to £430bn (£812m), of which four fifths went for export. Some indeed of those exports became highly controversial, when the U.S. via the Bell Helicopter group with which Agusta has an agreement, blocked deliveries to Iran of helicopters manufactured by the Italian company—to the great embarrassment of the Rome Government. Agusta none the less reported a profit of £6m for 1979 and has orders in hand of over £1,000bn.

Another company whose pro-

fitability is not in doubt is Macchi, the partner in the AMX project, but better known for its very successful jet trainers—first the MB-325, of which more than 800 have been sold, and now the praised MB-339 of which the Italian Air Force has ordered 100, and for which export hopes are as strong as they have proved for the MB-326.

Macchi indeed is a perfect example of the small company (its sales last year were only £70bn) which has thrived. The recipe for success is the familiar one in Italy—tight financial management and a high rate of self-financing, as much distance as possible between itself and the politicians in Rome, and concentration on a specialised, albeit small, corner of the market. A well-proven system of advance payments from customers has ensured that Macchi's cash-flow has remained healthy.

The question is how long this happy state of affairs can go on without a greater degree of Government co-ordination. A possibly alarming sign for the industry last year was the drop—from 48 per cent to 44 per cent—of the share of turnover which was sold abroad. The manufacturers' association warned that this trend was due to the inadequate production capacity of the industry, and the steady decline of its technology compared with that of foreign competitors.

To reverse this trend will unquestionably require massive investment, particularly in the research field, if Italy is to succeed in its hopes of establishing itself as a fully qualified partner in the joint ventures which are the future of the European aerospace industry rather than as a mere subcontractor.

The trouble is that the answers to these problems are political and it is unlikely that the politicians, whose capacity to produce forward-looking industrial policy worthy of Italy's economic weight has so far proved almost non-existent, will measure up to the task. In its absence the burden, as usual, will fall on the shoulders of the individual companies and managers.

Rupert Cornwell

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WEST GERMANY

Merger policy proved a mixed blessing

WEST GERMANY first emerged as one of the pioneers of the world's aircraft industry during the politically fragile days of inter-war rearmament. It was an era which spawned a string of illustrious plane-makers whose names emblazoned their aircraft: Junkers, Messerschmitt, Heinkel, Dornier, Focke-Wulf.

Nowadays the name Junkers is more likely to be found on a domestic hot water heater than on the side of a fighter aircraft. The dismantling of the German aircraft industry after the 1939-45 war put paid to some of the early technological advantages and the industry was forced to start more or less from scratch again in the 1950s.

Some of the names have stayed within the industry — Messerschmitt-Boelkow-Blohm (MBB) for example, is the country's largest aerospace concern with a turnover last year of DM2.6bn (£812m). The Heinkel family for a long time has had a small holding in Vereinigte Flugtechnische Werke (VFW) which, with sales of almost DM1bn, is second only to MBB in size. And Dornier, whose development of the flying boat in the 1920s and 1930s was revolutionary, is still a determined family concern, small but profitable.

Change of concept

But over the past decade there has been a steady awareness that Germany would have to drastically reshape its aerospace industry if it was to compete profitably against the U.S. aircraft makers, and co-operate with British Aerospace and Aerospatiale.

This recognition entailed a shift away from the concept of family businesses to one of greater size and greater State involvement. Only large units, it was reasoned, could spread the risk and cost satisfactorily.

The first significant move came a decade ago when VFW merged with Fokker, the Dutch company, but trouble seemed to be built into this transnational marriage almost from the beginning. While the Dutch factories worked successfully on the Fokker 27 and (to a lesser degree) the F-28 airliner, VFW in Bremen had to depend on the VFW-614, the ill-starred short-haul jet, and on its contribution to the European A-300 Airbus. Gradually the position was reversed — the success of the

Airbus snowballed and VFW grew more assertive within the partnership. In the final analysis, however, the centrifugal forces within the uncomfortable alliance made it increasingly clear that VFW's future lay in a merger with MBB rather than the Dutch company.

This year has seen the finalisation of the divorce from Fokker and at last a re-marriage between VFW and MBB seems likely before the end of the year. VFW's principal shareholders — Krupp, the city state of Bremen and United Technologies, the U.S. aviation and electronics group — have agreed to sell VFW to MBB effectively in return for a 10 per cent stake in the new merged concern.

There are still a number of outstanding issues — but they are negligible compared to the myriad of problems that have cluttered the path of the merger over the past three years. Four main points still have to be squared up before the merger can proceed. First, the shareholders have to agree on their respective quotas within the 10 per cent holding. Air industry sources believe the likely make up will be Krupp 3.5 per cent, Bremen 3.8 per cent, and United Technologies 2.8 per cent. Krupp, it is understood, will coordinate the three quotas — but that raises the second question: who is to get a seat on the new supervisory board?

One of the delaying factors in the merger negotiations last year was Krupp's insistence on a supervisory board seat and it seems unlikely that they will be prepared to go without one now.

But the board question is unlikely to be finally resolved before MBB and VFW come to an agreement on work share-out. At the moment, there is a crude north-south distinction to the work distribution. MBB's Hamburg plant and VFW in Bremen are heavily committed to the Airbus programme, though VFW's subsidiary Erno has been having considerable success as prime European contractor for the development of the U.S. Skylab. Erno is also collaborating with French industry to build the Ariane launcher and it has a strong line in communications and research satellites.

In the south of Germany, MBB's Munich-based headquarters is largely taken up with



The Franco-German Alpha Jet, built by a consortium comprising Avions Marcel Dassault-Breguet and Dornier, is proving to be one of the most successful light combat and training aircraft built on this side of the Atlantic. It is currently the biggest single Franco-German armament programme under way

military contracts. It is, for example, the German partner in the German-British-Italian consortium building the Tornado multi-role combat aircraft. MBB, even more than VFW, is strongly committed to satellite production and it is a partner in the Euromissile consortium which produces the Milan, Hot and Roland weapon systems.

The question is then: how should these work functions be reshuffled in the new merged concern? The answer at the moment seems to be very little. While VFW could certainly benefit from a few more military contracts being steered its way, there are no plans for a major upheaval and both parties are anxious to settle the restructuring as soon as possible.

Any streamlining will be watched with eagle eyes by the three state interests involved — Bavaria and Hamburg who between them have a 43 per cent share in MBB and Bremen. All of them are anxious that employment levels will be maintained.

The fourth related factor is how to evaluate VFW's factories. Three years ago, one suspects MBB would have managed to buy VFW's factories at a far lower price than is now being mooted. An independent valuation of the factories — taking into account the recent upsurge in Airbus sales and good prospects for further civil work — is regarded by some MBB executives as over-generous to VFW.

Nonetheless, it is clear that after several years of tough negotiations, the conclusion of the merger is now in sight, much to the relief of the Government which has been trying to prod the companies along. Chancellor Helmut Schmidt of West Germany has twice sent letters to the companies concerned and it is understood that Bonn is eager to see the merger finalised before the October elections.

Higher costs

But how realistic are Bonn's hopes that the new merged concern will be sharply competitive on world markets? Together MBB's and VFW's joint sales turnover would be in the order of DM 3bn — not a great deal compared to the U.S. giants. And it is not at all clear that the two companies' profitability — DM 44m for MBB last year, DM 9.8m for VFW — would necessarily increase after the merger. Rather, basic costs may well increase in the first years after the merger and profits are unlikely to keep up with sales growth.

Government officials are less pessimistic and believe that in the long run the merger will result in fewer subsidies having to be paid and in generally greater financial independence from Government.

A glance at the current and forthcoming programmes gives only limited support to this view. There is a preponderance of multi-national projects and while, in the case of the Airbus, this can be beneficial by extending the production line and lowering unit costs, it can also turn out to be a rather expensive proposition.

The fly-away price of the Tornado, for example, is now more than DM 35m compared with DM 15m when it was first conceived 10 years ago. The system price is even higher — an estimated DM 67m. This is due partly to improved technological — especially electronic — sophistication achieved during the years of development, but there is little doubt that the high inflation in Britain and Italy has also contributed to an increase in the final costs. Even the Airbus, which has notched up remarkable success — it has a 31 per cent share in the wide-body market — is unlikely to reach break even point before 1989, according to MBB executives.

All of this has made the Gov.

ernment extremely apprehensive about projects such as the new European tactical fighter, which may be based on the TFX-90 which promises to be an even more expensive proposition — at a time when the defence budget is under pressure from soaring fuel costs, and from political demand for a stronger fleet and boosted aid to Nato countries such as Portugal and Turkey.

The German Air Force has agreed on some of the basic principles of the combat aircraft with their British and French counterparts, but there is still a long way to go. The cheapest option for the Defence Ministry would probably be to buy from the U.S. — but this is considered to be a bad move at a time when the new merged national aerospace concern is trying to establish a foothold.

Options

The other options are to co-operate just with the British, just with the French or with both the French and British together. Defence officials have hinted that a trilateral project may prove too costly — above all, the Tornado costs, also a trilateral project, have not been forgotten. There is, however, the fact that the German makers cannot produce a commercially successful fighter by themselves — some form of international collaboration will be needed.

Besides the Tornado, the other major military project in the German air industry at present is the Alpha Jet programme — the largest German-French armament project. Until 1981, three Luftwaffe wings and several formations of the French Air Force are to be converted to the Alpha, which is intended mainly for close support tasks. Dornier constructs the fuselage rear section, assemblies the wings, tail and fin and some smaller components in the forward fuselage system. About 175 are due to be delivered to the Luftwaffe by the end of 1981.

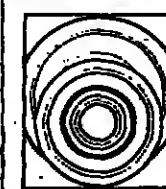
It is already evident that the European Airbus A-300, its various derivatives, and military contracts will form the bread and butter of the new merged concern.

But one of the most interesting growth areas will be in space projects, in which Germany is taking an increasing interest. Erno, apart from its role in the development of the Spacelab, is also collaborating with French industry to build the Ariane launcher. The third string to its bow is satellite construction — a potentially very profitable interest shared by MBB and Dornier.

However, the German space industry is at a fledgling stage, illustrated by its precarious dependence on external developments. The U.S. Shuttle timetable, for example, has been constantly postponed, creating a degree of uncertainty about how dependent German industry should be on projects such as the Spacelab. In addition, the second of four Ariane test launchings ended in a crash; the European Space Agency has already decreed that if any other Ariane test launchings go amiss, then the project will have to be reconsidered.

The new German aerospace concern is entering an uncertain world, where collaborative military projects are costing more and more, where profit margins are vulnerable, and where the growth sectors such as space are overly dependent on more established partners. But, German officials and industrialists agree, only a merged national (though not nationalised) aerospace concern is the only way to keep these factors under control and the only way that Germany is going to become a major force again in world aircraft construction.

Roger Boyes



PM Superalloys

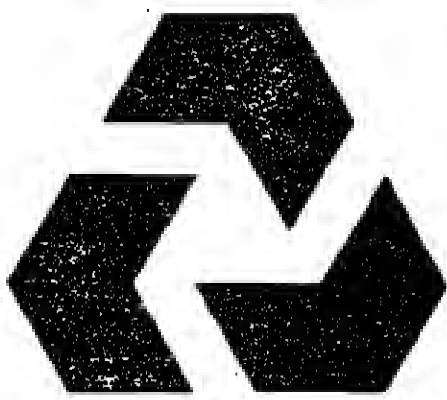
CONFERENCE ON AEROSPACE MATERIALS FOR THE 1980s

Recent uncertainties about the availability of strategic raw materials used in superalloy production — cobalt, tantalum, molybdenum, niobium, etc. as well as concomitant rises in prices, have given renewed impetus to the trend to powder metallurgy (PM) because of the better utilisation of material that the process affords. For example, to make a jet engine turbine disc weighing 11 lbs by conventional processes requires a starting ingot weighing as much as 150 lb, while the same disc can be made from a powder preform using only 40 lb of input material.

An international conference reviewing all aspects of PM SUPERALLOY production (availability of strategic raw materials, powder production, component production, etc.) will be held in Zurich, November 18-20, 1980, and will be of interest to anyone concerned with aerospace engine design and construction.

An Exhibition will run concurrently with the conference and will show PM superalloy products, and production equipment.

Further information from:
Bernard Williams, Conference Organiser
18/19 Talbot Chambers
Shrewsbury, Shropshire
England
Tel. 0743 64675 Telex 35637 Alfast



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FRANCE

A rapid increase in export orders

THE MEASURE of how far France's aerospace industry has come can be found in some of the country's more neglected kitchens. There one can find refrigerators from the late 1950s, equipped with streamlined handles and adorned with aircraft emblems, with instruction leaflets explaining that they were made in one of the factories of Sud-Aviation, the ancestor of today's Aerospatiale, France's largest, state-owned aircraft, missile and space company.

Memories of the broken state of the French air industry after the Second World War, when the Americans and British had built up a long lead and French companies were reduced to making domestic appliances, makes the present strength and success of these companies seem even greater.

The sense of euphoria and optimism about France's ability to confront the U.S. giants in this prestige sector led the French not only to crow about their own achievements—sometimes at the expense of their partners—but also to overlook some of the pitfalls and

problems that still remain to be solved.

The whole industry, public and private, beams with success. Export orders last year totalled more than \$6.5bn, almost as much as the sector's overall consolidated turnover during the period. Without an increase in the 105,000-strong workforce, sales were up 24 per cent, foreign deliveries were 17 per cent up and France's trade balance in aerospace was some \$2.6bn in the black.

Having got the last of the ill-fated Concorde off its bands, Aerospatiale last year made its first profit for eight years. Its aircraft division, which had long weighed it down, saw a 62 per cent increase in orders. The Dassault-Breguet group, whose Mirage fighters have played a crucial role in securing France a place as the world's biggest arms exporter outside the U.S. and the Soviet Union, has seen sales soar this year: an increase of more than 50 per cent in the first half compared with the same period last year. The U.S. Air Force, of all people, are showing interest in a Franco-U.S. engine, and licensing agree-

ments for French helicopters now extend from Brazil to China.

This rapid expansion means that France is increasingly dependent on foreign markets. Exports now account for about 58 per cent of sales, compared with less than half in 1975. In the 1980s the proportion will be more like 60 per cent, with a military sector remaining largely export-oriented and the civilian sector looking for new outlets. The future market for the European Airbus, for instance, or for aero-engines, is overseas. France has to offer credit conditions and dollar prices according to those set by U.S. manufacturers, at a time when production costs in France are rising comparatively faster.

Tight margins

On the civilian side, the industry is vulnerable to economic uncertainties and to monetary disorders. In the military sector, competition is increasingly tough and margins are getting tighter.

The main feature in the civilian aircraft industry is, of course, the triumphant record of Airbus, which the French, who are equal main partners with the West Germans, have an irritating tendency to regard as their own product. Assembled at Toulouse, France's air industry capital, Airbus has broken the link attached to that last co-operative project, Concorde.

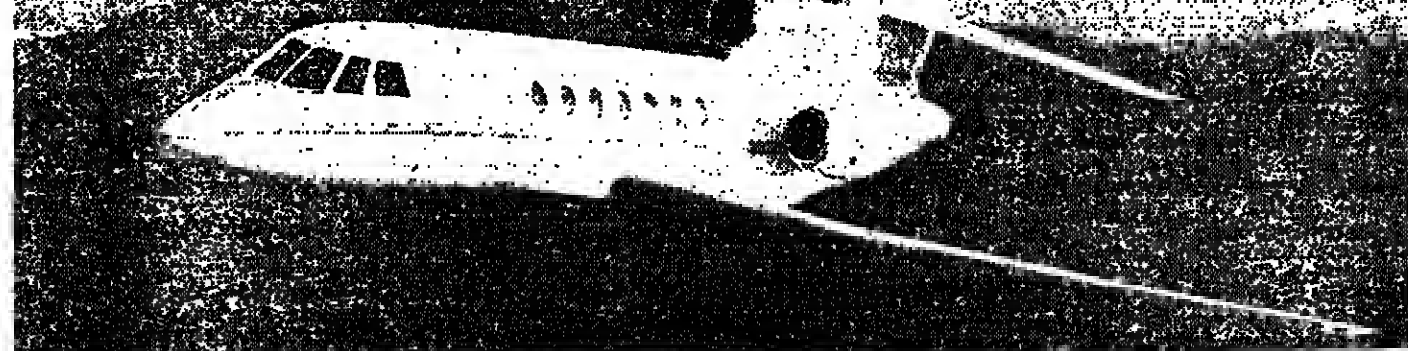
Airbus A-300s are already being flown on all five continents by 19 airlines. Another 16 airlines, at the time of writing, had aircraft on order. The total of firm and provisional orders was 417, including 139 for the new generation of short-to-medium range A-310s, due to go into service in 1983. Kuwait recently became the first Middle Eastern client to opt for the new twin-engine aircraft to replace its Boeing 707s.

Calculating that these client airlines will make follow-up orders, Airbus Industrie reckons it already has some 800 aircraft sales "in the bag" and is well on its way to proving itself a profitable venture.

The influx of orders has, however, momentarily shown signs of slowing. Last year brought 11 new clients, the first half of this year only three. Swissair snubbed the European venture for its latest purchases.

In the U.S., Airbus's big breakthrough was Eastern Airlines' order for 25 aircraft, with an option on nine more and the prospect left open of a further 25 aircraft in the 1980s. But so far, Eastern is the only client it is the same thing that happened with the Caravelle, France's last really commercial airliner, back in the 1960s.

Boeing's position in its home market is hardly dented. Compared with the Seattle giant, Airbus, with ambitions of producing 1,000 aircraft, is still small. Its production capacity is limited and its range of aircraft limited, although various possibilities for smaller or longer-range models are being studied. Aerospatiale is pooling its separate project for a smaller aircraft of up to 50 seats with



The Avions Marcel Dassault-Breguet Falcon family of executive jet transports has proved highly successful over the past few years. The picture shows from front to rear the Series 50 three-engine aircraft and the smaller twin-engine Series 20 and Series 10

the Italian company Aeritalia. They hope to bring out an aircraft in 1985, competing against, among others, projected British and Swedish products for a promising regional market, particularly in North America.

The French Government has made the first move in bringing the country's two main aircraft companies closer together by setting up a holding company to manage holdings in Aerospatiale and the State's 21 per cent stake in Dassault-Breguet, acquired along with a blocking vote at the end of 1978. Dassault-Breguet, though existing hand-in-hand with the Defence Ministry, had until then been wholly private.

Teething troubles

Dassault, partner with West Germany's Dornier in the Alpha-Jet trainer/ground support aircraft, is planning its future largely on its new generation of Mirages—the 2000, which is the French Air Force's future strike and interceptor aircraft, and the 4000, a twin-engine version of the same fighter, destined exclusively for export.

The Mirage 2000 has had teething troubles. The most important has to do with the radar system, made by the French Thomson group. The sophisticated equipment designed for the aircraft will not be ready until 1985, and the Air Force will now be taking delivery in 1983 of aircraft

fitted with a more traditional system.

The aircraft has also suffered a setback in the world market with Australia's opting to buy U.S. fighters, partly to replace its ageing Mirage IIIs. Both the Mirage 2000 and the Anglo-German Tornado were turned down for the deal, now awaiting U.S. Congress approval.

New markets for helicopters, in which Aerospatiale has a leading position in Europe, are now being exploited more through licensing agreements than by direct exports. In Brazil, a joint venture, Helibras, in which the French State company holds 45 per cent, was inaugurated in April. Puma helicopters are to be assembled in Indonesia, and last month a deal worth around \$100m was signed with China by Aerospatiale and the engine company Turbomeca. The Chinese are at first to buy 35 to 40 Dauphine helicopters—a model already ordered last year by the U.S. Coast Guard, much to the anger of Bell Helicopter. They will later make both the bodies and the engines at separate plants with an increasing percentage of local parts.

The French State-controlled aero-engine company SNECMA has made a minor breakthrough in the U.S., where a first deal has been signed to equip some of the USAF's KC 135 tanker aircraft with the CFM-56, an engine developed jointly with General Electric of the U.S. The deal marked a round in the Franco-U.S. team's battle

with Pratt and Whitney, which had already been beaten in the bidding to equip Air France's A-310 airbuses.

A bigger order may follow. The CFM-56, which has been used as a replacement on a number of airlines' DC-8s, has been tried by Boeing and has a potentially huge replacement market for 707s. This would be a major step forward for SNECMA, which is anxious to increase its non-military activity.

Strong hopes

In space, France remains the country with the strongest belief in a viable European alternative. The European Ariane launcher rocket, in which France has by far the largest share among the 10 partners, finally got off the ground last Christmas Eve after six years of research and two false starts. But the second launching from Kourou, French Guiana, in May was a flop, reminiscent of Ariane's unfortunate predecessor, Europa II, which flew for two minutes back in 1972. A Paris newspaper rather unfairly printed the headline: "France Launches a Submarine."

The next trial is due in November. At least one of the next two tests has to be successful for the first commercial launching to go ahead as planned next year. Ariane, on which both Aerospatiale and the Matra missile group are involved on the French side, has a large potential market to compete for, with some 200 satellites

due to be launched in the next 10 years. The international Intelsat organisation recently converted two options into firm orders. But with only one successful launching behind it, the European group has a long way to catch up on the U.S.

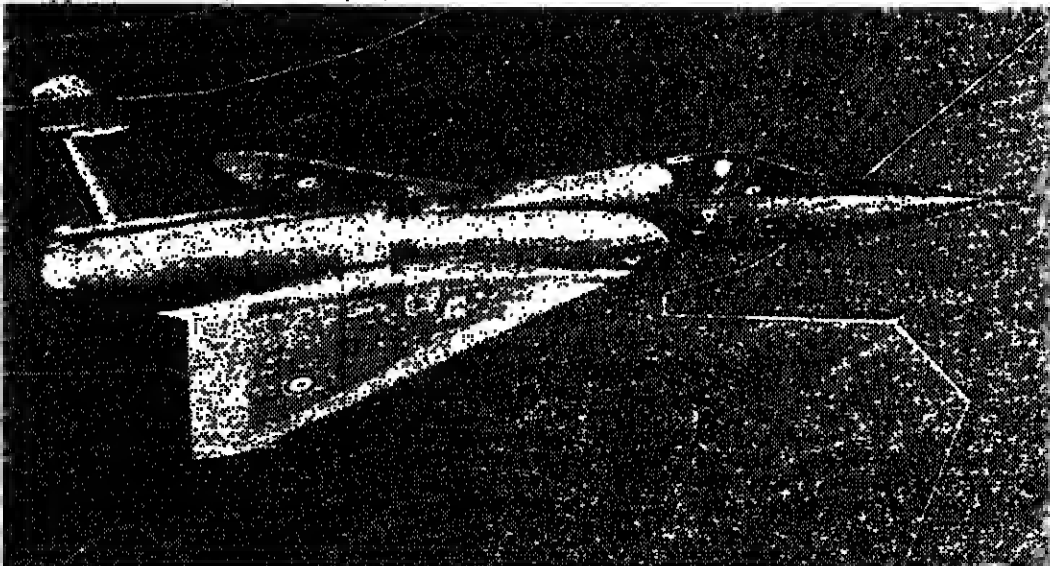
Space will take up a large chunk of the Government's financial contribution to the industry, already heavily dependent on State support.

A report on aerospace in preparation for France's 1981-85 National Plan pleads for Government backing for development of civilian projects to be at least maintained and to be increased in the military sector.

The report, drawn up by a committee headed by M. René Ravaut, chairman of SNECMA and head of the French air and space industry group, GIFAS, sets out four major aims—ability to keep providing France's essential defence needs, a significant and lasting position in selected areas of the civilian aircraft business, an international role in launchers and satellites, and development of export potential.

It sets the target of a net trade balance for the industry of FFr 80bn (close to \$20bn) during the five-year period. But to reach efficient production levels, it says, France is going to have to make some strategic choices and reduce the range of products with which it tries to compete on the world market.

David White



The Avions Marcel Dassault-Breguet Mirage 2000 now under development as an interceptor and air-superiority fighter. Several hundred aircraft may eventually be built for a variety of roles, including reconnaissance and strike missions

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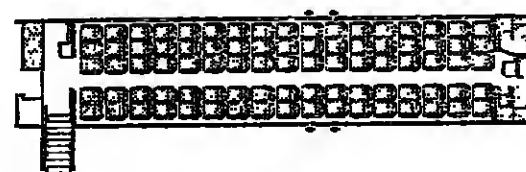
crew, landing, and navigation charges, the total operating costs of the F28 are nearly 40% less.

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AEROSPACE XIV

SWEDEN

Political change gives Saab-Scania a breathing space

THE SWEDISH aerospace industry has won a breathing space. In May the Riksdag (Parliament) voted SKr 200m (\$48.2m) in public funds to enable Saab-Scania to research and develop the JAS, a light-weight multi-purpose aircraft to be used by the Swedish Air Force in the 1990s.

A final decision on whether to order the aircraft will be made in 1982. Meanwhile Saab-Scania will be able to keep together its research and development staff and remain a fully fledged manufacturer, capable of designing and building its own aircraft.

The May decision represents a noteworthy comeback for the Swedish industry, which appeared last year to have lost the chance of maintaining its development capability when the Liberal minority government turned down a plan to build a light attack/trainer aircraft for the air force.

The resumption of the Moderate-Centre-Liberal coalition

after the 'non-Socialists' narrow general election victory last September and the return to the Defence Ministry of Mr. Erik Kronmark, a leading Moderate (conservative) politician, opened the way. But the final signal for a reversal of policy in favour of developing a new Swedish aircraft came from the Supreme Commander, General Lennart Ljung, in February.

Going beyond his brief from the Government, which was to choose from three options—the light attack trainer aircraft, the modernisation of the Air Force's Saab Draken aircraft or the purchase of the American F-16 fighter—General Ljung proposed instead that the long-term requirements of the Air Force could best be met by an aircraft designed specifically for Sweden's unique air base system.

Provisionally designated the JAS, this would be a new "platform" combining air defence, ground attack and reconnaissance roles but with a

sufficiently short take-off and landing capacity to operate from rough air strips or highways. Most pertinently, General Ljung pointed out that the relatively small initial research and development costs could be contained within the current defence budget, while a decision on production could be deferred until 1982.

But a murmur

The Government accepted the Supreme Commander's proposal and in May the Riksdag allocated funds with only a murmur from the Social Democrat opposition about the exact amount. The JAS is intended to replace the Saab Viggen in service with the Air Force in the 1990s. General Ljung put the cost of a JAS programme at SKr 19bn (\$4.5bn) at 1979 prices.

The JAS may never fly. In approving the research allocation the non-Socialist majority in the Riksdag defence committee stressed that the option

of buying a foreign aircraft remained open. With restraints on budget spending likely to continue until 1982 price will be a vital factor.

On the other hand Saab has acquired the opportunity to develop a new major military aircraft project. Its own investment in the project will at least equal the SKr 200m Government allocation. It is due to submit specifications in September. Two elements of the JAS are already evident. First, it will be a lightweight, 8-10 tonne aircraft made largely of composite materials and much smaller than the Viggen. Secondly, foreign involvement will be greater than in the Viggen. To keep the price down Saab will have to incorporate a lot of developed components and there should be considerable scope for foreign electronics and avionics suppliers.

Suggestions have been aired that Saab might co-operate with other European manufacturers in developing the new "plat-

form" but at Saab headquarters in Linköping executives are more eager to develop yet another aircraft with a specifically Swedish profile.

Despite its lack of success in finding foreign buyers for the Viggen, Saab nurtures the hope that it might yet develop a product suited to the defence requirements of customers outside the big military pacts. At the political level consideration for Sweden's neutrality is still a powerful factor in favour of producing a new Swedish aircraft.

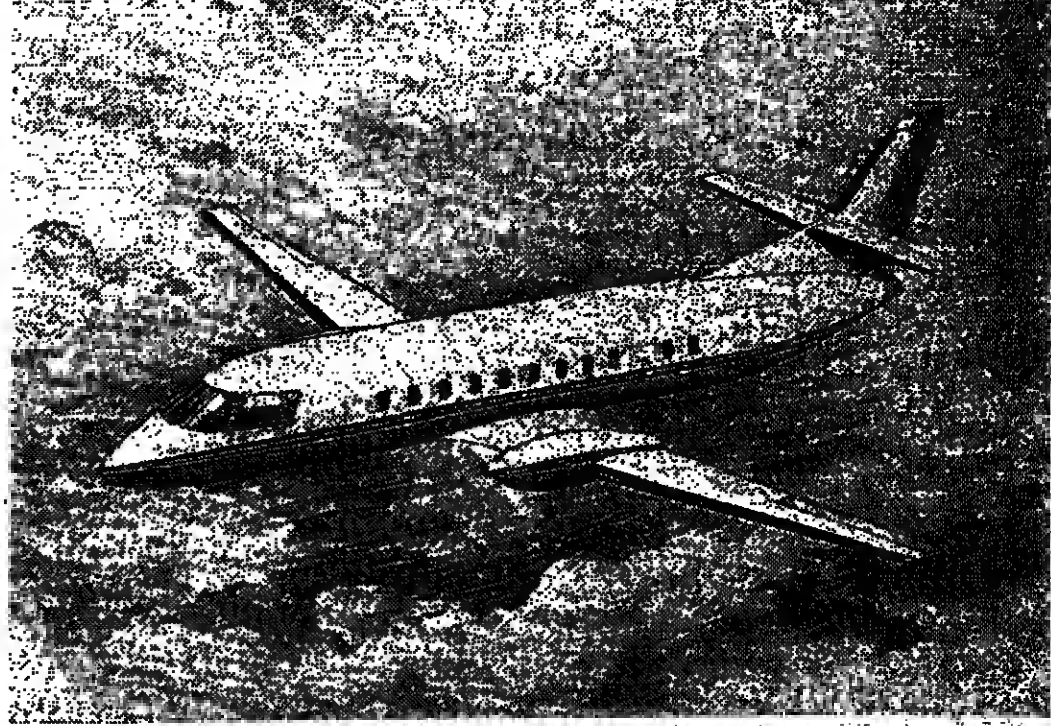
The JAS project will also ease the switch towards civil aircraft production for Saab-Scania's aerospace division. Mr. Sten Gustafsson, managing director, wants to achieve a balance between military and civil production by the end of the 1980s. Last year military products accounted for 83 per cent of the group's aerospace sales.

Saab took a potentially important step towards this objective in January when it signed an agreement with Fairchild Industries of the U.S. to build a new commuter aircraft. Final specifications for this aircraft are scheduled to be released in time for Britain's Farnborough Air Show.

Designated the Saab-Fairchild 340, it will be a twin turbo-prop 34-seater with General Electric CT-7 engines. The Swedish-American combine—the first European-U.S. partnership covering construction of a complete aircraft—is challenging De Havilland of Canada, Britain's Short Brothers, Embraer of Brazil and Commuter Aircraft Corp., Ohio, in a market which it estimates will be looking for over 2,000 aircraft in the next 10 years.

Saab and Fairchild intend to start building two prototypes this autumn. The fuselage will be built at Linköping, the wings and tail unit in Texas. But assembly and testing will take place in Sweden. The target is to deliver the first production aircraft in 1984. Saab has received a SKr. 350m Government loan to help finance its investment in the commuter aircraft.

The choice of General Electric to supply the engines for



Saab-Scania of Sweden and Fairchild Industries of the U.S. are collaborating in the development of a new 34-passenger twin-turbo-prop "commuter airliner," intended to enter service early in 1984. The first flight is expected late in 1982 or early in 1983. The aircraft is designed specifically for short-haul routes of low traffic density, with the U.S. market especially in mind.

the Saab-Fairchild 340 was a blow to Volvo, the Swedish concern with the second largest stake in the aerospace business. Its Flygmotor subsidiary builds modified Pratt and Whitney engines for the Viggen.

Striving

Volvo had hoped that Saab and Fairchild would choose the Garrett TPE-331-15 turbo-prop engine, in the development of which Flygmotor bought a 15 per cent share earlier this year. At the same time it took a 5.6 per cent holding in the Garrett TPE-731-5 turbo-fan engine.

The two co-operation agreements with U.S. engine manufacturers are costing Volvo some SKr 800m, including the Government loans. But, like Saab, Volvo is striving hard to balance its military production with the development and

manufacture of engines for civil aircraft.

Optimism prevails at Volvo Flygmotor's Trollhattan headquarters, despite the loss of the Saab-Fairchild engine contract. The management believes it will have enough work to maintain its present labour force into the early 1990s and is aiming at an output balanced equally on straight military contracts for the Swedish Air Force, commercial aero engines for both civil and military use not funded by the Swedish Government and non-aerospace products, of which hydraulic machinery is currently the most promising.

A project on which it rests much hope is the TFE-1042, a development of the Garrett TFE-731 engine to suit light military aircraft carried out mostly by Flygmotor, which has applied its experience of after-

burner techniques to the Garrett core engine.

The TFE-1042 was successfully tested last year and is now being vigorously marketed by Volvo and Garrett. The plan is to build it in three versions, with thrusts varying from 3,500 lb to over 8,000 lb.

Flygmotor also has a toehold in space technology. It bought a small share of the European Ariane project last year and is manufacturing the combustion chambers for the first and second stages of the Ariane rocket.

All in all, 1980 has proved a promising year for the Swedish aerospace industry. Saab-Scania's research and development capacity has been revived and the move into commercial aircraft production has got under way.

William Dullforce



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AFTER YEARS of dithering Israel decided a few months ago to press ahead with its plan to produce a new jet fighter to succeed the Kfir combat fighter which was Israel's first venture into supersonic jet fighter production. It was a crucial decision for the future of the country's aircraft industry because without a new project of this dimension it faced serious contraction as the Kfir became obsolete after almost a decade of production.

Employing 20,000 directly and providing work for another 5,000 indirectly through sub-contractors, the Government-owned Israel Aircraft Industries (IAI) is one of the country's largest concerns. The effect of any major reduction of this workforce on the national economy undoubtedly played a role in the decision to produce a new jet fighter.

This is not to suggest that the Israeli aerospace industry is a one-product venture—far from it. IAI offers a range of 350 military and civilian products and services. These include an executive jet, sea-to-sea missiles, an STOL cargo passenger aircraft, as well as electronics, engineering and combined technologies divisions.

IAI sales in the 1979-80 fiscal

year reached \$560m with exports accounting for \$323m or 58 per cent of the total. So far the company has not released the budgeted figures for the current year.

Though the Kfir is the pride of the Israeli aerospace industry, none of these combat-proven aircraft based on the French Mirage fighter has ever been sold abroad. Austria, Taiwan and a number of South American countries were interested, but the Austrians lost interest and the other sales have been vetoed by the U.S. Government, which supplies the General Electric J-79 engine.

Unconfirmed

The company refuses to confirm a recent report from France that it has bid against the Mirage for the supply of jet fighters to Colombia. All the company will say is that it is still involved in "serious on-going negotiations" with a number of countries for the sale of the Kfir.

The political spoke which the Americans placed in the wheel of Kfir sales abroad may also affect the planned new aircraft, which will be called the Lavie (Lion) and is expected to be equipped with the General

Electric F-404 engine. Bet Shemesh Engines, which produces 30 per cent of the J-79 engine, is hoping to produce 60 to 70 per cent of the components for the F-404, following U.S. Government approval for co-production of the engine.

The Lavie will be a single-engine, single-seater, delta-winged fighter-bomber which will replace the Israeli Air Force's aging Skyhawks and Kfirs. At the moment IAI is "preparing the paperwork" for the project. It has no date as yet when the work cycle will start but officials speak of a prototype flying in the mid-1980s.

Planning and building the body is expected to cost \$750m. Mr. Ezer Weizman, the former Defence Minister, said when announcing the decision to go ahead with the project. An additional \$200m will be spent on acquiring rights and preparing the production line for the engine.

Another piece of good news for the aircraft industry is the removal of the U.S. Federal Aviation Authority (FAA) regulation which up to now had prevented the marketing in America of the Arava STOL

passenger and cargo aircraft. The company is expecting to receive FAA licence for the aircraft any day and is negotiating a marketing arrangement with an American company.

At the moment negotiations are continuing with an American businessman who has offered to buy 130 Aravas for feeder line services if the IAI can get the FAA licence. The deal should be worth more than \$200m.

IAI has sold 70 Aravas to Latin American customers, and has orders for at least a dozen more. The company hopes that the opening up of the U.S. market will prove very fruitful for this work-horse, which can carry 20 passengers or 2.3 tonnes of cargo.

The company has already had favourable experience in the U.S., where it has won 20 per cent of the market for its Westwind executive jet series. This aircraft was developed from the Jet Commander, which was purchased from an American company in the late 1960s. Aircraft deliveries for 1980 will be 42 and there are 51 aircraft on order for the period April 1980-May 1981.

The Westwind sells for

CONTINUED ON NEXT PAGE



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AEROSPACE XV



The twin-engine Fokker F-28 Fellowship short-to-medium range jet transport has for the past decade complemented Fokker's other major transport aircraft programme, the F-27 twin-turbo-prop Friendship. Fokker is now planning a new jet airliner programme, the F-29, on which a formal launch commitment is expected soon.

HOLLAND

Fokker: a lone David in a world of Goliaths

PROSPECTS FOR the Netherlands' small, but active, aerospace industry have improved markedly over the past 12 months. Fokker, the aircraft maker specialising in short to medium-haul airliners, has freed itself from its ties with the German VFW group. The continued expansion of international satellite programmes is creating new opening for Dutch companies involved in space technology, though the Government has been criticised for missing commercial opportunities.

Fokker finally reached agreement earlier this year on the financial details of its split with VFW, its partner for the past 11 years. The two companies agreed to dissolve the Dnessel-dart-based holding company through which they had unsuccessfully tried to pool their efforts. This has left Fokker free to develop its own civil aircraft programmes.

Reviewing the breakdown of the alliance, Fokker's new chairman, Mr. Frans Swartouw, attributed much of the blame to the divergent interests of the two groups. The German company was primarily a military aircraft maker while Fokker's strength lay in civil airliners. Where Fokker's expertise lies in marketing its aircraft to commercial airlines around the world, VFW is mainly a defence contractor working for governments.

Intervention

Government involvement in the aircraft industry meant the two companies could sometimes not take sensible commercial decisions—to shift production from one plant to another—because of official intervention. The Dutch are proud that they have been an aircraft industry though Fokker is clearly a lone David in a world of Goliaths. The Netherlands is the smallest of the six countries in the industrialised West with her own industry capable of designing, making and marketing civil aircraft.

With turnover of just under £1bn (\$515m) following the split with VFW, Fokker is only just big enough to survive. A publicly-quoted company with no direct government shareholding, it must compete, in Western Europe at least, with larger nationalised groups.

Government backing is given to support individual aircraft programmes—the highly success-

ful F-27 turboprop has paid substantial dividends into the Dutch Treasury—but Fokker has no wish for closer government links. This means, in the view of Mr. Swartouw, that present turnover must be doubled or tripled over the next decade if the company is to remain viable.

New managers have been brought in to take Fokker into the 1980s. Mr. Swartouw, aged 47, came to the company two years ago from the highly successful container company, European Container Terminal, which he built up in Rotterdam. Mr. Dan Krook, formerly on loan to Airbus Industrie, has been brought back to head Fokker's marketing effort while other senior executives have been hired from within the aircraft industry and from outside.

Mr. Swartouw has been responsible for Fokker's decision to work with, rather than compete with, the American competition. Rising development costs will mean that ad hoc partnerships of aircraft manufacturers will become even more important in future. Elements of the airframes of the F-27 and its jet sister aircraft, the F-28, are produced by four different companies while Fokker is one of eight concerns involved in making the Airbus A-300.

A company the size of Fokker must maintain three main civil aircraft programmes at any one time to guarantee its future, says Mr. Swartouw. It now has two programmes in full swing, one in an advanced stage of preparation and a fourth under consideration. They are:

● The F-27, of which more than 700 have been sold, including 205 made under licence by Fairchild Industries in the U.S.—making this the most popular turboprop airliner ever built. Fokker hopes to achieve 1,000 sales before the F-27 is retired in 10 to 15 years.

The passing of legislation in the U.S. which allows commuter airlines to fly bigger aircraft has opened up a potentially large new market for the F-27. A recent study by Fokker of the U.S. commuter market projected a need for 180 aircraft in the F-27 class as well as for 80 or so in the F-28 range.

● The F-28 was developed as a jet counterpart to the F-27 but has never achieved the same success. Tough competition in

its sector of the market has kept sales to a disappointing 160 or so since deliveries started 11 years ago.

● The F-29, Fokker is currently holding talks with potential partners in the U.S., Japan and Europe to build this 130-160 seat jet. The Dutch company hopes to decide by the middle of next year whether to definitely go ahead with the aircraft, which would come into service in 1985.

Many design details have been agreed in consultation with airlines around the world but further refinements will be announced at the Farnborough Air Show. Fokker needs Dutch Government support to fund this \$800m to \$1bn project but is also seeking foreign partners to share the costs.

Boeing has agreed to supply the 737 fuselage for the F-29 and talks with Government agencies in Japan as well as the Fuji, Kawasaki and Mitsubishi companies over the building of the wings are also well advanced. Discussions have been held with Airbus Industrie but the European consortium is not keen to cooperate with Boeing.

Competition

Airbus is also in competition with Fokker for the favours of Japanese industry, having proposed cooperating on its own short-haul airliner.

Fokker therefore seems most likely to team up with the Japanese and either Boeing or Airbus, with the U.S. company apparently the most likely choice. In a break with past practice Fokker aims to carry out assembly of the F-29 abroad as well as in the Netherlands. This would reduce production costs and help in breaking into local markets.

● An advanced turboprop airliner. Spiralling fuel costs have increased the attractions of turboprops. Fokker has begun studies of an entirely new aircraft using advanced technology for the short to medium-haul market.

Apart from its own aircraft programmes Fokker is a partner in the Airbus consortium, despite occasional conflicts of interest. It has a 6.6 per cent share in the highly-successful wide-bodied A-300 and an interest of just over 1 per cent in the smaller A-310.

High European production costs mean that Fokker has been making a loss on the

A-300 so it is currently negotiating with Dutch government for it to meet any losses on the A-310.

Fokker is happy to stay away from the politicking involved in defence projects. A small company in a country with very limited military aspirations is not well placed to head military programmes, it argues. But it does see both work and profits in taking part in international defence contracts. These are the cream in Fokker's coffee, Mr. Swartouw says.

Fokker is a member of the multinational consortium which is building the General Dynamics F-16 fighter. It is producing 617 mid-fuselage sections and wing part sets as well as carrying out the final assembly of 174 aircraft for the Dutch and Norwegian air forces.

The Netherlands is closely involved in the European space effort. Fokker and the Philips electronics group are the main participants but 30 or so smaller companies also supply components. They are currently engaged in work for the European-manned Spacelab, the Ariane launcher and two communications satellites.

The Dutch also have their own national space programme, often working with foreign partners. The Astronomical Netherlands Satellite, launched in 1974, led on to the Infra-red Astronomical Satellite. This second satellite, in which the U.S. and Britain also participate, will survey sources of infra-red light in space. The need for further tests on the U.S. part of the programme has led to a 12-month postponement of the launch to August, 1982.

Studies have begun of a third scientific satellite, though this has been criticised by the Government's advisory council on science policy. In June the council called for a more commercial approach to space research and for greater co-operation within a European framework.

In the council's view, the Dutch Government has missed opportunities presented by the European Space Agency programme to attract projects to the Netherlands.

It wants an expansion of the Dutch space effort but at the same time calls for a close watch on how the £1 100m (\$52m) of Government funds, which go into space research annually, are spent.

Charles Batchelor

New jet

CONTINUED FROM PREVIOUS PAGE

between \$2.5m and \$4m and is being produced at a rate of four a month. Apart from the U.S., sales have been made in Australia, West Germany, Switzerland, Mexico, Venezuela, Colombia, Ecuador and Uruguay. There is also a maritime surveillance version available.

One advantage which Israeli aerospace manufacturers enjoy over many competitors is that they can offer combat-tested hardware. One of the most successful of these has been the Gabriel sea-to-sea missile. The Israeli Navy sank 13 Soviet-made missile boats in the 1973 war, and that track record has proved an attractive draw for customers around the world.

IAI is very tight-lipped about its customers for this product, confining itself to saying that the missile "sells well to friendly navies around the world." So well indeed that with sales and orders of \$350m the Gabriel weapons system, which includes search radar and fire control units, is the company's largest-selling export item.

In June last year the Gabriel Mark III was introduced with a range of 36 km, a 150 kg radar-active homing warhead and an airspeed of Mach 0.65. Its makers claim it can perform in a dense electronic environment

and all weathers up to sea state No. 5.

A recent addition to the stable of IAI products is a retrievable unmanned drone for observation called the Scout Mini RVP (remotely piloted vehicle). With a maximum altitude of 10,000 ft and flight endurance of four and a half hours, the spy craft carries an assortment of TV and photographic equipment and is launched from truck-mounted catapults. The company reports some export sales have been made but offers no details.

Integration

Basically the Israeli aerospace industry is concentrating on offering integrated defence systems which can take care of clients' needs in the air, on land and at sea.

Arising out of the country's own defence needs, the IAI has diversified its range of products to include a naval patrol boat, tank crew helmets, a tank driver command system used in the Israeli Chariot tank, air defence command and control systems, radar and even an anti-tank weapon called the Picket fire-and-forget weapon.

The company also has a plant in Jerusalem called Mata Helicopters which specialises in the overhaul, maintenance, renewal

and refitting of civil and military helicopters. It handles all helicopter dynamic components, including main and tail rotor blades, gearboxes, clutches, shafts and swash plates. Despite the knowledge and skills acquired through this operation, the company says it has dropped an earlier idea of possibly eventually making its own helicopters.

Though the IAI is the dominant company in the Israeli aerospace field, there are other companies also at work. Rafael, the Defence Ministry's Armament Development Authority, has been marketing its battle-proven products for years. These include guided and unguided weapons, electronic intelligence, special computers and communications systems.

Four of the largest jet engine manufacturers in the world are among the customers of Iscar Blades, a commercial company which produces precision formed and machined gas turbine and jet engine blades. Bet Shemesh engines also makes gas turbine engines for industrial and aeronautical applications as well as myriad parts for small engines and other aircraft components.

TAT Aero Equipment Industries produces fluid control systems, fuel pumps, cockpit instruments and allied items. A

variety of hydraulic ground equipment for military and civilian aircraft is produced to client specifications by Mecbela Engineering and Manufacturing.

Feeling the pinch

The export drive will be intensified by all these companies as the domestic cuts in the defence budget this year will mean reduced orders from the Israeli defence forces. The pinch has already been felt, with IAI having steadily laid off its foreign workers during the past two years and having taken on virtually no new local workers in the past year.

The joy felt throughout the industry by the decision to go ahead with the Lavie military aircraft is being tempered by fears that the plan could yet be cancelled by a new Government. A new set of politicians might consider it an unwarranted expense to plan from scratch a project designed to provide about 200 aircraft for Israeli Air Force and one which might face the same overseas marketing problems as encountered by the Kfir. But the industry is meanwhile keeping its fingers crossed.

David Lennon

Electronics of the future

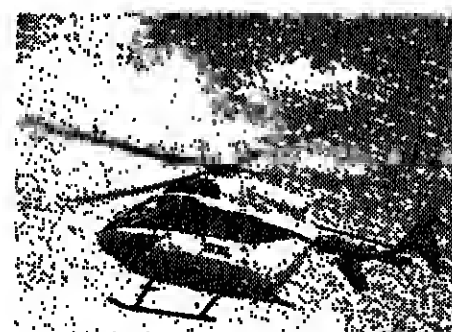
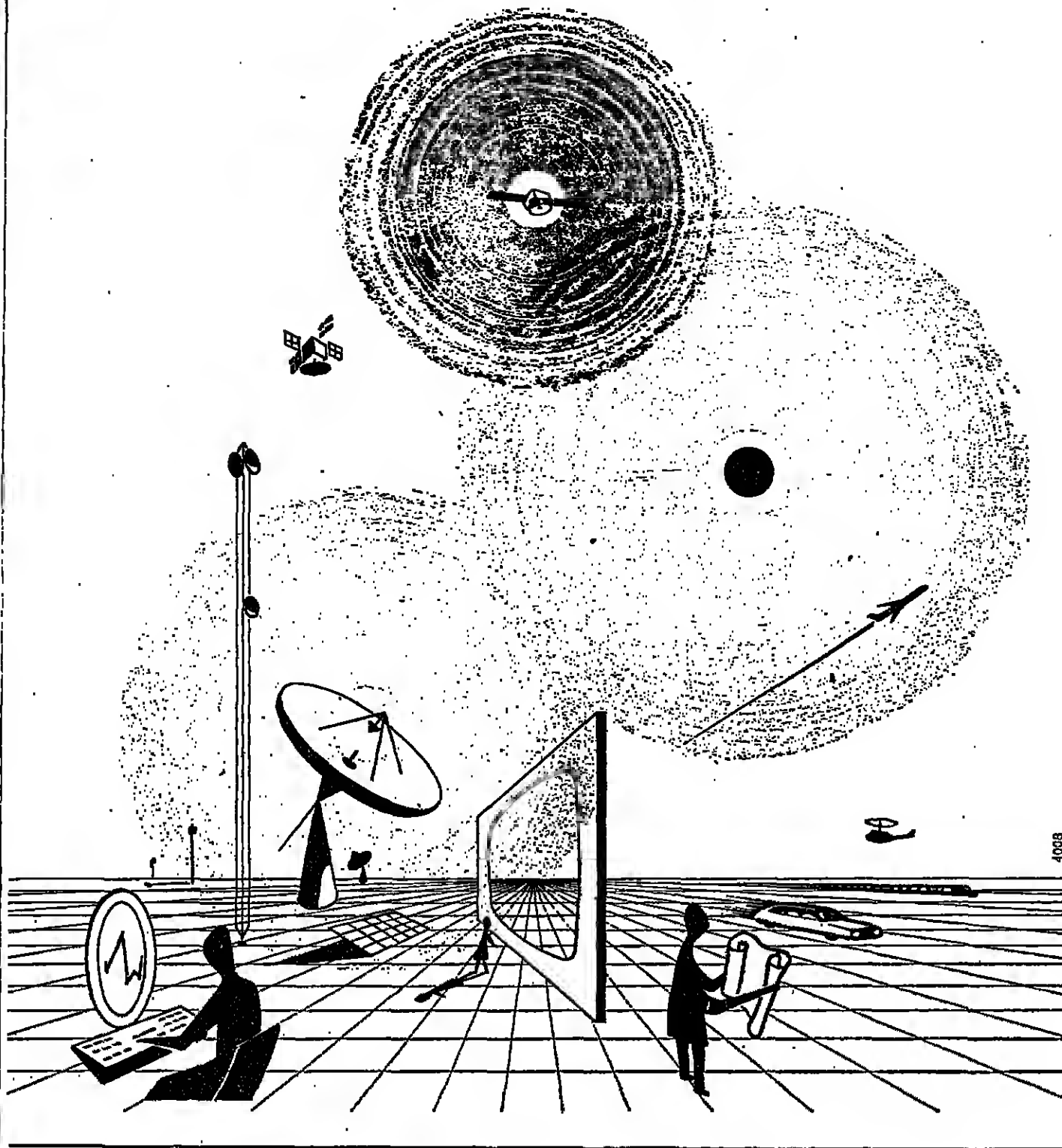
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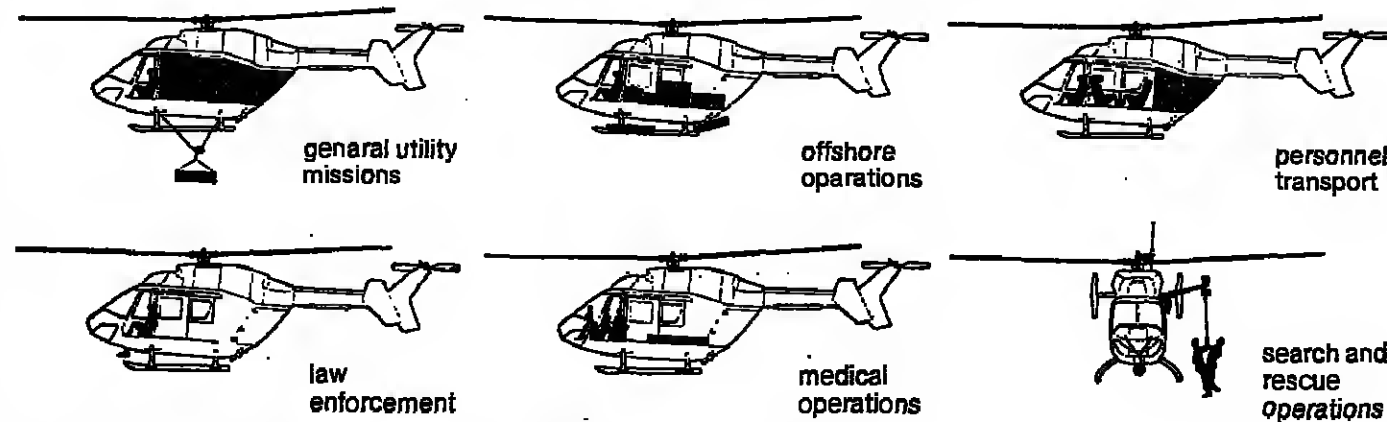


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AEROSPACE XVI

JAPAN

Joint ventures are the key to future development

THE DOMESTIC Japanese aerospace industry is still far behind its European and U.S. counterparts in both size and technical level. While Japan's Gross National Product (GNP) is now second largest in the free world, aerospace sales in the financial year (FY) 1979 were only some ¥300bn (or about \$1.3bn), which is only one-third of the U.S.'s total aerospace business, one-fourth of France's, one-third of Britain's and about one-half of West Germany's.

Even when all Japanese aerospace operations are added together, the scale is still smaller than that of many overseas competitors such as Aerospace, Boeing, British Aerospace or McDonnell Douglas alone.

One major reason for such low production levels is that the Japanese aircraft industry has historically been highly dependent on military demand. Even when YS-11 transport production was at its peak, military sales were still some 81 per cent of Japan's total aerospace business. In comparison to Japan's traditionally high dependence on military demand, Canada's is only about 50 per cent of total aerospace sales, Britain's, America's and France's some 60 per cent each, and West Germany's and Italy's some 70 per cent.

Low exports

Japan's exports of aerospace products have also been low, accounting for only 6.2 per cent of total production in FY 1979 and an expected 10 per cent in FY 1980. In Canada, on the other hand, exports account for 65 per cent of total aerospace production, in France 50 per cent, Britain 40 per cent, West Germany 30 per cent and in the U.S. for 20 per cent.

Technically speaking, the Japanese aerospace industry has the capability to develop almost any product by itself except for supersonic transports or wide-body airliners.

Japanese companies have become particularly adept at design work, and in this area are almost on a par with European and U.S. industries. Japanese production technology in the aerospace field is, however, behind that of other advanced nations, particularly in the areas of quality cost and the development of special tooling.

Nevertheless, Japanese companies have still been successful on a limited but growing number of international sub-contract bids against more experienced European and American ones.

While Government and industry are working hard to promote the growth of the nation's aerospace industry, because of the high added-value and wide technical-spinoff potential to other fields, the so-called "Japan Inc." is far from gaining a leading position in the aerospace field as it has done for example with cars.

The primary course Japan has decided to follow to promote further aerospace development is through more joint-venture and licensing agreement with overseas companies, according to the latest government guidelines. In August 1980, the Ministry of International Trade and Industry's special advisory council suggested Government support for international joint-development programmes particularly in the civil field, such as the RJ-300 fanjet engine project with Rolls-Royce and the planned "YX-X" 100-150 seat civil airliner programme.

The council also urged the government to support the development of high-speed turbo-prop technology and continued studies of various possibilities for new aircraft development, such as a hybrid lighter-than-aircraft, a flying-boat commuter-transport system, hydrogen-powered aircraft and ultra-light aircraft.

In June 1980, the Society of Japanese Aerospace Companies' "long-term vision" committee defined what it calls the two most important things for the industry's future: 1—building the capability to develop new aerospace technology independently; and 2—the successful development and production of various new aircraft.

Committee chairman Hiroshi Nakagawa (professor at Chiba University) explains that Japan must first develop the 100-150 passenger YX-X and then develop some revolutionary aircraft such as a high-speed turbo-prop or commercial flying boat. As a prerequisite for such projects, he adds, "Japan needs more large-scale research and test facilities."

The National Aerospace Laboratory (NAL) has been working on the development of an

experimental "Quiet STOL" research aircraft since FY77, and a Kawasaki C-1 jet transport is now being modified with USB (upper-surface-blowing) and other high-lift systems for flight testing during FY's 82-83. In the military field, the Defence Agency Technical Research and Development Institute is now researching advanced control concepts with its so-called CCV modified T-2, which is to undergo flight testing during FY's 83-84.

In the engine field, the FJR fanjet project was undertaken by industry as a Government-sponsored programme to increase the nation's technological base in this field, and the Defence Agency is also developing a so-called F-3 light turbofan for powering its planned MT-X intermediate trainer replacement. Despite these major programmes and many significant past accomplishments, the Japanese industry is still far behind other nations in terms of aerospace R and D capability.

The Ministry of International Trade and Industry (MITI) is most directly involved with the restructuring of the nation's industry, including the promotion of the aerospace sector. For this purpose, MITI relies on its advisory councils for the basic expertise in setting guidelines.

Based on these recommendations, MITI provides support in various ways such as conducting large-scale national projects (like the FJR fanjet) and by direct financial support for the development stages of joint-development projects such as the currently operating YX (Boeing 767) with Boeing and Aeritalia of Italy, the RJ-500 with Rolls-Royce, and the proposed YX-X. This so-called "subsidy," however, is actually a Government loan which must be paid back with interest by industry when the project turns a profit.

Concerning the YX-X new transport project, MITI's advisory council has advised the Society of Japanese Aerospace

Companies to set up a special YX-X committee to be in charge of organising this project during the development stage, and it also requested that SJAC send a second survey mission to Airbus Industrie and Fokker in Europe in late July to survey the latest possibilities for joint-developing the YX-X with either of these companies.

MITI hopes to narrow down the list of possible YX-X partners by mid-August to be in time for the FY '81 budget request. SJAC's YX-X committee will also carry out an independent airline survey, including marketability of a new 100-150 seat transport, ideal seating arrangement and other

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preparatory design requirements.

Regarding international joint-development projects, MITI is concerned mostly with the nature of Japan's share in any proposed project (i.e., is Japan to be a full partner, or not?) and would Japan have manufacturing rights, or not?

To define what course the nation's aerospace industry should take in the future, MITI's Aircraft and Industry Council started in the spring of 1979 a total reevaluation of the industry's various priorities for the future. The proposals discussed above were released in the Council's interim-report last August. In addition to the

above mentioned projects, the Council also recommended that the Government promote the development of new technology in the fields of aerospace processing technique, aircraft equipment and new materials.

This report received much attention as it clearly pointed out the areas for the Government to concentrate on in the future, and further deliberations by the high-level advisory group, when revealed in their final recommendations next spring, are expected to spell out a firm Government policy for the aerospace industry during the 1980s.

Paul J. Rubin

Farnborough leads Europe in aerospace research

TO THE public, Farnborough is the setting for one of the world's great air shows every two years. To the professionals of aviation, however, Farnborough is one of the world's great aerospace research centres. With its 10 outstanding aircraft and a budget of over £80m this year, the Royal Aircraft Establishment (RAE) is 'the biggest of the 12 research establishments of the Ministry of Defence, and the biggest research centre of its kind in Europe.'

The RAE is primarily a defence research establishment, although not exclusively for the RAF, which accounts for only an estimated 54 per cent of its effort. The rest divides between the Navy (13 per cent) and Army (9 per cent), and 11 per cent devoted to tri-service activities. The balance of 13 per cent covers its civil aviation programme. Its considerable resources include 50 aircraft of its own with a replacement value of £200m at 1979 prices; ranges valued at some £70m, and windtunnels at more than £100m. Above all, it has over 2,000 qualified scientists and engineers among its staff of 6,700.

The RAE has undergone a major reorganisation in the last

few years, masterminded by Mr. Rhys Probert, the director who died recently. Mr. Probert, one of the pioneers of jet engine development, re-organised the RAE as an integrated research system in response to a growing appreciation of the importance of properly understanding complex systems if a modern weapon is to work satisfactorily.

The big system problem is one that besets every defence research establishment as it tries to keep afloat in the flood of new information. For the RAE the problem is exacerbated by the fact that complete weapon systems—such as the Nimrod Mark 3 airborne early warning aircraft and the air defence version of the Tornado, to name two which are making their public debut at this year's air show—finally come together at Farnborough for their acceptance trials. No other defence research establishment has the responsibility for approving such complex systems. Its responsibilities extend to attempts to see a complete battle zone as a single integrated system.

The RAE's programme spans basic systems work (and, of course, the science behind it), the development of new equip-

ment in collaboration with contractors, and the flying of equipment as integrated systems. About one-fifth of its work goes into systems engineering, estimates Mr. Harold Robinson, acting director. A great deal of effort goes into balancing the flying system as a whole. One of its biggest problems is to decide just how much a new system should rely on human intervention, and how much on "intelligence" built into the system. "The human is one of the best information processors—but slow," acknowledges Mr. Robinson.

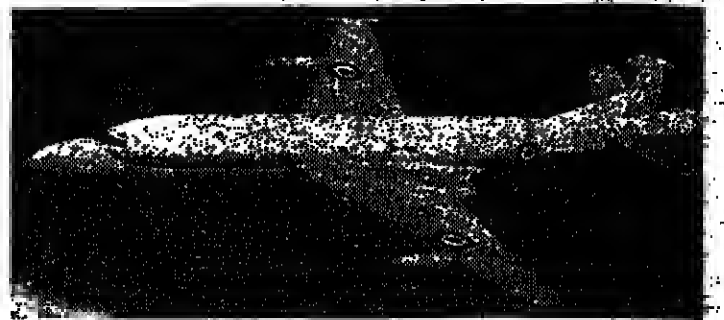
With the £10m Tornado GRI, the multi-role combat aircraft which will replace the Vulcan, Canberra and Buccaneer aircraft in RAF service, Farnborough's systems engineers see the end of an era for Europe. They have been trying to plug more and more "black boxes" into a central computer. Tornado needs six times as much memory as the Jaguar, and has three times as much data being exchanged between its black boxes.

The proposed European Combat Aircraft (Jaguar replacement) will have to be a "brain" distributed all round

the aircraft in the form of microprocessors and silicon chips. The Americans have already done this for their F-16 fighter, which includes one key British black box, the head-up display, plugged into a common data highway running right round the aircraft.

Strung round a laboratory at the RAE is the kind of engineering equipment expected to integrate all the weapons and controls of the next generation of RAF aircraft and helicopters, from the late-1980s. A thin black cable looped round the walls inter-connects numerous pieces of avionics equipment spread out on the benches. Each equipment has its special silicon chips tailored to talk the same language so that they can communicate with one another almost as freely as the sub-systems of the pilot—hands, feet, eyes, ears, etc.—communicate with each other.

A lot of the complexity of the weapon system has been encapsulated in the silicon chips—large-scale integrated circuits—so the black cable is merely a telephone line for the chips to talk to each other, no matter where they may be tucked away in the aircraft. Another major advantage, Farnborough is



British Aerospace's Nimrod airborne early warning aircraft with mission system avionics designed and developed by Marconi-Elliott Avionics. Equally effective over land and water, the AEW Nimrod has been designed to replace Shackleton AEW aircraft currently in service with the Royal Air Force.

learning, is that such systems are highly resistant to interference, no matter whether accidental or deliberate, due to electronic countermeasures by an enemy. Because the system is constantly checking upon its own integrity "it's very easy to detect and reject corrupt messages," says one senior researcher.

Looking further ahead, the researchers foresee that with such a data highway built into future aircraft, such as the Jaguar and Sea King replacements, it will become far easier to update an aircraft. Avionics systems are advancing in performance much faster than either airframes or aero-engines. From the nineties a new generation of avionics plugged into the same airframe may provide the Services with what for all practical purposes is a brand-new weapon system.

David Fishlock

Ten years later there's still only one.

Rolls-Royce RB211

The engine they couldn't resist.

Rolls-Royce RB211

Doesn't every American admire a pioneer?

Rolls-Royce RB211

They've just put up the price of not specifying Rolls-Royce on the 747.

Rolls-Royce RB211

There's only one engine in the world's most technologically advanced aircraft.

Rolls-Royce RB211

These advertisements, from newspapers and aviation magazines around the world, show just a few of our better-known achievements in civil and military aviation.

Achievements like the jump-jet and the RB211—the most fuel-efficient engine you can specify for the 1982 generation of 747s.

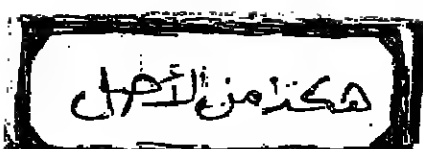
They show something of why Rolls-Royce power has been chosen by more than 100 air forces, for over 60 types of aircraft. Something about why more than 240 of the world's airlines fly on Rolls-

Royce power and of how we achieved export deliveries worth over £1.4m every single working day last year. Meanwhile, back at the drawing board, we are busily working on tomorrow.



Meanwhile, back at the drawing board...

ROLLS-ROYCE LIMITED, 65 BUCKINGHAM GATE, LONDON SW1E 6AL



WHY BUSINESS IS HELPING TO PAY FOR SPORT AND THE ARTS

The hard-headed sponsors

Banks take account of the future

COVENTRY CITY football club will, not after all, be named Coventry Talbot. But in the next few months, in a variety of ways, followers of the club will be left in no doubt that it now has a special link with the struggling car maker.

The deal, thought to be worth about £20,000, came under fire almost from the moment Talbot signed it. The Football Association and the BSC objected above all to the name change which would have ensured that the name Talbot appeared on every football coupon, in newspaper results and above all, on television.

Yet there is a clear feeling that this amounts to holding a finger in the dyke. Business sponsorship of sport has been big business for some time and it is spreading to other areas as well.

Last week BAT Industries, the only tobacco manufacturer to disclose the full extent of its promotional budget, announced that it plans to give the Philharmonia Orchestra £200,000 over the next two years. BAT says the link with its du Maurier brand will "enhance the elegance and style" of its cigarettes.

Operators have grown used, meanwhile, to the fact that the Imperial Group sponsors productions at Covent Garden while other companies—not all of them cigarette manufacturers—also back a host of other musical ventures. Imperial's research shows that its notes in the Covent Garden programmes reach an influential audience of decision makers, particularly in the City. It suggests that it may be money well spent.

This year corporate sponsorship of sports activities is expected to total more than £30m and arts organisations are expected to receive more than £2m. It is a process actively encouraged by the Government and in particular by Mr. Norman St John-Stevas, the Minister for

the Arts. He has urged organisations from theatre companies to orchestras to ask industry to make up shortfalls in their budgets.

But it is not of course a coincidence that so far it has been the brewers, the banks, the oil companies and the cigarette manufacturers which have been the biggest spenders. All these sectors are vulnerable to public criticism—the banks and the oil companies because of their pro-

vision. But not all the reasons a business gets involved in sponsorship are susceptible to this kind of cost benefit analysis. They vary from company to company and attempts to measure concrete results do not always succeed.

Nevertheless, it is possible to isolate several reasons why companies get involved in sponsorship.

First, particularly in the case

albeit subconsciously, to make a link between such "high class" events and the Benson and Hedges brand.

Second, sponsorship can increase general awareness of a company's name in a way that generates good will. Thus the brewers sponsor darts matches and in the same way Talbot sees as one of its main reasons for signing the Coventry football deal the opportunity of boosting customer recognition for a name that is less than a year old.

Third, sponsorship, and this applies to many companies, can be public "evidence" of corporate responsibility. The oil companies such as Shell, BP and Esso, brewers such as Guinness, and computer groups like IBM, advance this as their main aim for backing sports or the arts.

IBM defines corporate responsibility as "trying to alleviate problems which threaten the stability of society and to do this 'it is involved in projects which provide no immediate credit or material return.' The company, in line with this policy, has backed a series of regional musical and theatrical productions and recently underwrote a £35,000 guarantee for the Royal Academy's Post Impressionist Exhibition.

It is relatively easy for companies to become involved in sponsorship. Most large organisations say they are inundated with letters asking for help and what started out as a small affair in the 1950s is now big business. In fact, the promotional agencies which act as marriage brokers between donors and recipients. Agents, it is claimed, can charge up to £2,000 for the introduction and take up to 25 per cent of funds raised.

Sponsors and sporting and arts bodies give these marriage brokers mixed reviews. Gallaher, through its brand, Benson and Hedges, mainly opts for sponsoring televised up-market sporting events. This month the company will have put up £57,000 of the £100,000 prize money for the Gold Cup at York. Smokers are expected,

more direct links are established.

The BAT Philharmonia deal was arranged directly between the two groups and this trend is set to continue as more arts organisations appoint internal sponsorship scouts, as already happens in the United States.

Sponsorship does not provide the corporate tax haven many critics suppose. The Inland Revenue says that a company claiming a sponsorship deduction against tax has to show that expenditure was incurred exclusively as a business cost, for example, advertising. Gifts to charity, particularly local charities, can also be written off against tax since the last Budget as such expenditure is included under good will, a realisable asset.

The Government's favourable attitude to sports sponsorship is reflected by indications that it intends to renew the 1977 agreement on a code of practice with the cigarette companies. This prohibited the use of particular brand product names for events, ruled sports of particular interest to young people out of bounds and limited spending to 1977 levels in real terms.

Business sponsors normally opt for a "sound" type of event whether in the arts or sport. Their critics complain that corporate backing sometimes means an undue emphasis on the fashionable or the prestigious and they worry about the vagaries of fashion. But supporters point out whole sectors of Britain's leisure activity are now partly dependent on business money.

Dr. Samuel Johnson described a patron as "one who looks with unconcern on a man struggling for life in the water, and when he has reached ground encumbers him with help." Such damning criticism has not yet been levied at corporate sponsors. It remains to be seen if it will.

Lisa Wood and Gareth Griffiths

from which they get no commercial return—amount to a similar order of magnitude, if not more. But as the one sector of the economy that never seems to face hard times, the banks have got used to being regarded as a general source of munificence.

NatWest's decision to expand its sponsorship into a mass appeal "big name" area has raised eyebrows in the banking world. Its rivals say the plan will make no difference to their relatively low key approach to sponsorship. But there is no doubt that the experiment will be closely watched by the other banks—and could be copied if it proves successful.

The Big Four clearing banks have backed projects ranging from net ball coaching to Mount Everest expeditions. But their general aim is to focus sponsorship on clearly defined sectors of the population from which they hope to extract good will and, with luck, accounts in the future. The broad brush approach adopted by NatWest for the cricket cup will be a significant departure—but it remains, for the moment, the exception.

The highly targeted nature of the banks' activities explains why there were distinctly cool about the idea put forward by Mr. Norman St John-Stevas, Minister for the Arts, for a trust fund into which the banks would lump together their spending on the arts. Under the proposal the banks feel they would lose their individuality. "We'd rather do our own thing" was the universal response.

The Big Four each have large sponsorship programmes ranging from £250,000 to £800,000 a year. The sums could however hardly be called lavish in relation to their profits. In fact, the banks' charitable donations—

major commercial groups—put the largest chunk of its arts money into The National Youth Orchestra of Great Britain.

In sports, football (because of the hooligan element) and racing (the link with gambling) are out. Most of the banks however support some kind of equestrian competitions. NatWest's activities include rowing, rugby, fencing and hockey. Barclays, skiing and rugby. Lloyds does not sponsor any sports at all but puts a lot of money into junior chess, a favourite game of chairman Sir Jeremy Morse.

Midland has moved their sports sponsorship into more downbeat areas to try to appeal to "unbanked" sections of the population. Next year it will be sponsoring the world angling championships, and it is also spending £50,000 in supporting gymnastic activities in schools.

The banks say that evaluation of the effects of sponsorship is extremely difficult. Midland says its activities are "additional background" to back up more obvious forms of promotion like advertising.

The other sector of the City that also goes in for sponsorship—the insurance industry—claims its activities are easier to assess as they are less diverse. Corhill, for instance, has been sponsoring Test matches since 1978 as its only form of promotion.

Before it started, samples showed that a mere 2 per cent of the population ranked it as a major force in insurance. Now, the "name awareness quota" has gone up to 16 per cent. According to Mr. Fred Dinmore, Corhill's manager responsible for the cricket support, "that proves sponsorship works." He adds wryly that every year since the Corhill Tests started, it has been a rotten summer.

David Marsh



THE PHILHARMONIA DU MAURIER LINK: Mr. Peter Roberts, BAT managing director, with Mr. Martin Jones, chairman, Philharmonia Council.

fits, the brewers because of alcoholism and the link between alcohol and crime and the cigarette manufacturers because of the link between smoking and cancer.

The banks, which are dealt with in the accompanying article, base their sponsorship, in part, on a hard-headed calculation that for a relatively small amount of money there are considerable advantages in sponsoring a whole range of events particularly those that attract large audiences on tele-

vision. Cigarette manufacturers, sponsorship helps sell products. Cigarette market shares are heavily dependent on advertising: recent research showed that a complete advertising ban in Norway led to a fall in smoking.

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Letters to the Editor

Japanese know-how

From Mr. N. Heaney

Sir,—Sir Michael Wilford's emphasis (August 13) on technology as a key to Japan's industrial competitiveness is of paramount importance for Europe, yes, but also for the U.S. and the U.S. Yet there is

In Japan three years ago I sought answers to the question, How is Japan able to beat us so handily? It was evident that co-operation between unflagging management and the well-educated and indoctrinated work force yields products of high quality and low cost. Waste is fought at every stage by relentless, exacting methods.

For example, Toyota's system of production control, known as Kanban, has now spread throughout the automotive industry. The system requires suppliers to deliver material in small lots, once, twice or three times daily, directly on to the assembly line. Lightning-fast tool changes become essential: Toyota changes an entire automatic press-line from left to right fenders in six minutes, and the first right fender is "good." The system reduces in-process inventory to a trifling fraction of that seen in the U.S. and Europe.

Without an understanding of the range and depth of Japan's industrial know-how, we may not take flight sufficiently.

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Unlimited cash

From Mr. A. Reynolds

Sir,—Mr. Murdoch (August 21) may have been permitted to take only one cash advance per week on his Visa card in Singapore but I have not found such a rule in the U.S. For example, on April 15 I drew \$500.00 in Dallas and on Friday of that week \$400.00 in San Francisco. Moreover the second advance, having a sterling value of £175, was appreciably in excess of the £100 limit mentioned in Mr. Friedman's article.

Neither did Mr. Friedman say how cheap this facility can be. There is a 1½ per cent fee but the currency does not have to be paid for until you repay Visa at the end of the 25-day free credit period. So until then your sterling can be on deposit earning interest. My \$400.00 advance was drawn on the second day of my Trustcard billing period. By the time I had to pay Trustcard, I had earned the equivalent of \$5.37 in interest. This almost covered the \$6.00 cash advance fee.

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the act." At most, it would make its scope more limited than would a rival interpretation.

The approach of Lord Russell in his speech, with which the other Lords of Appeal merely concurred, is highly unsatisfactory, if I may respectfully say so, in that it amounts virtually to disregarding the words in issue and in doing so, flies in the face of both the general rules of statutory interpretation and the implications of the structure of the section, in which the words "determined by the rating of the work" are the only distinction between the provisions relating to like work and those relating to equally rated work.

I remain of the opinion that the appropriate interpretation of the Act is that contended for by the employers and supported by the reasoning of three separate, carefully reasoned judgments in the courts below. In fact, I think that, perhaps without realising it, your correspondent is, in the second half of his ninth paragraph, supporting the employers' argument and disagreeing with Lord Russell, although I would not accept that the examples which he gives are appropriate ones.

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similar, we were told was the reason for the PO having to change from Viewdata to Prestel for the name of its national videotex service. But there was an independent private limited company View Data registered to exist since some years before that.

Then, whoops, "Prestel" was found to be also the name of, I think, an Italian product imported into this country and trading under that name for some time—luckily, in a product category a long way from an information service, so British Telecom's Prestel thrives on.

But how did anyone successfully register "Telecom" in the first place? Have not most businessmen for many years been using "telecon" and "telecom" to mean respectively "telephone conversation" and "telephone communication" as regular business jargon/short-hand? Perhaps, then, the PO came to this view as well and can be forgiven its seeming lack of foresight.

And perhaps the Government should try and save a little more money by throwing out the Registry of British Trade Marks also, when it dispenses as planned with the Register of Business Names, if such hoobs continue to be perpetrated (sorry, "Boobs" is probably someone's registered trade mark...)

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